

The AUTOMOBILE

Willys Starts New Knight Régime

Elyria Plant Builds All Knight Motors—Chassis Assembled in Toledo—Four-Cylinder Car at \$1,095—One Chassis and Four Body Types

FOR the first time in the history of the automobile industry, a car with a non-poppet-valve engine is to be produced in quantity. It has remained for John N. Willys, the mainspring of the Willys-Overland Co., Toledo, Ohio, to see the possibilities of the Knight sleeve-valve motor as a production proposition, and his plan to popularize it is revealed in the new Willys-Knight car at \$1,095.

Although this is not the first sleeve-valve car to be built by the Willys organization, which really has been developing the Knight motor since 1913, it marks the beginning of the type as a big factor in the Overland business. Heretofore the Willys-Knight cars were built entirely at the Elyria factory, and their design was not such as to admit of large quantity output. They were sold last season at \$2,475.

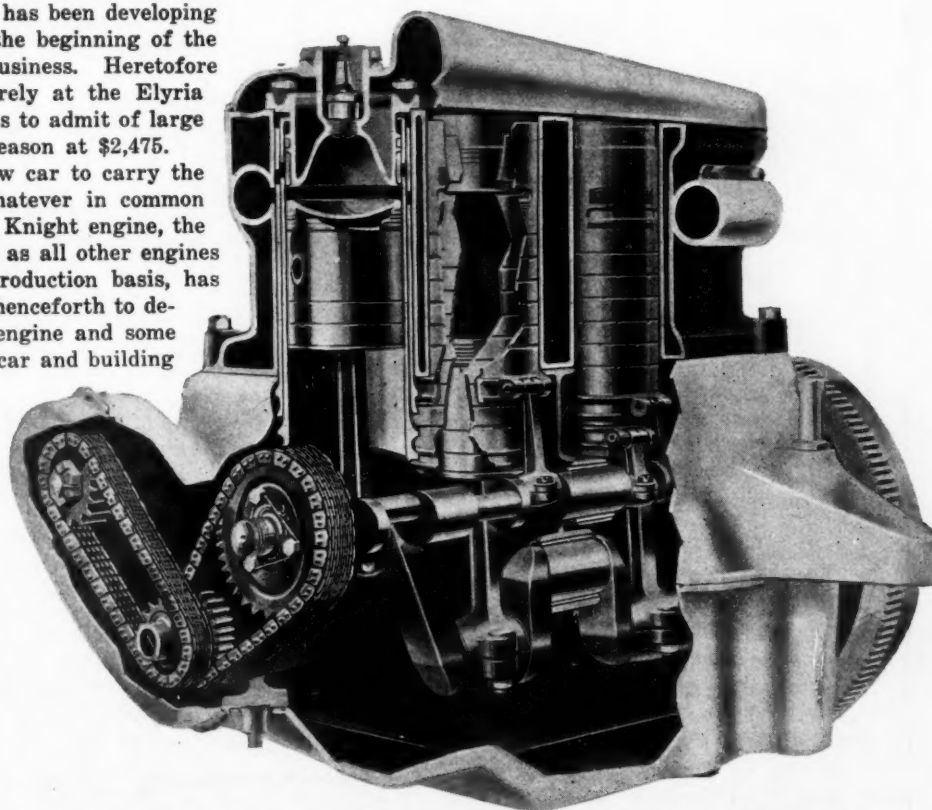
But all this is changed now. The new car to carry the name of Willys-Knight has nothing whatever in common with former cars of that name. A new Knight engine, the same in basic construction and principle as all other engines of the type, but brought down to a production basis, has been developed, and the Elyria plant is henceforth to devote its entire energies to making the engine and some of the parts with the assembling of the car and building of the chassis to be done in Toledo.

Nor do the present rather extensive production plans represent a finality as to the sleeve-valve car output as a part of the factory's production. In fact, the coming season's activities with the Knight-motored car are regarded as merely the beginning of this model with the Willys organization. A separate branch of the factory, known as the Willys-Knight division, has been formed, and it will handle the affairs of the sleeve-valve car separately.

The connection of the Willys-Overland Co. with the Knight engine goes back to 1912 and 1913 when Mr. Willys met Charles Y. Knight. Mr. Willys was skeptical of its merits,

and it was not until after he had taken a trip through Europe in a Knight-motored car that he became convinced of its value.

The new Willys-Knight engine, one of the lightest sleeve-valve types yet produced, is 4½ by 4½. The rating given is 40 hp. and the power curve shows this obtained at 1400 r.p.m. With no falling off in power, the power curve is



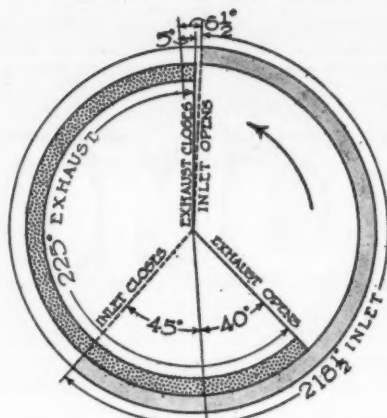
Section through the new Willys-Knight four-cylinder block motor with silent chain drive through the eccentric shaft. This motor gives 50 hp. at 2000 r.p.m. The bore is 4½ and the stroke 4½ in.

practically straight reaching 50 hp. at 2000 r.p.m., and at 1000, delivering 29. The precision method of valve actuation has much to do with the steady increase. The cold compression of the engine is 75 lb. per sq. in.

Cylinders Block Cast

In outward appearance it is not unlike many of the clean-cut poppet types now being built. The cylinders are cast in a block and are carried on a two-part aluminum crankcase. In Knight engine building, this is the third design to be made with the cylinders in block, and the production advantages are at once apparent. Thermo-syphon cooling is used and here again there is only one other example. There is a separate aluminum plate covering the top of the cylinder block, forming the top of the waterjacket of the heads and the outlet to the radiator. It is held in place by four nuts which screw down on the tops of the cups in which the spark plugs are placed.

By the method of using the plate as the top of the water-jacket, it is possible to have the waterjackets around the cylinders communicate with the heads of the cylinders, which are individually detachable, as in all Knight engines. In many of the designs, the heads are jacketed separately, and external piping is used to communicate between the two por-



Timing diagram of the new Willys-Knight block motor

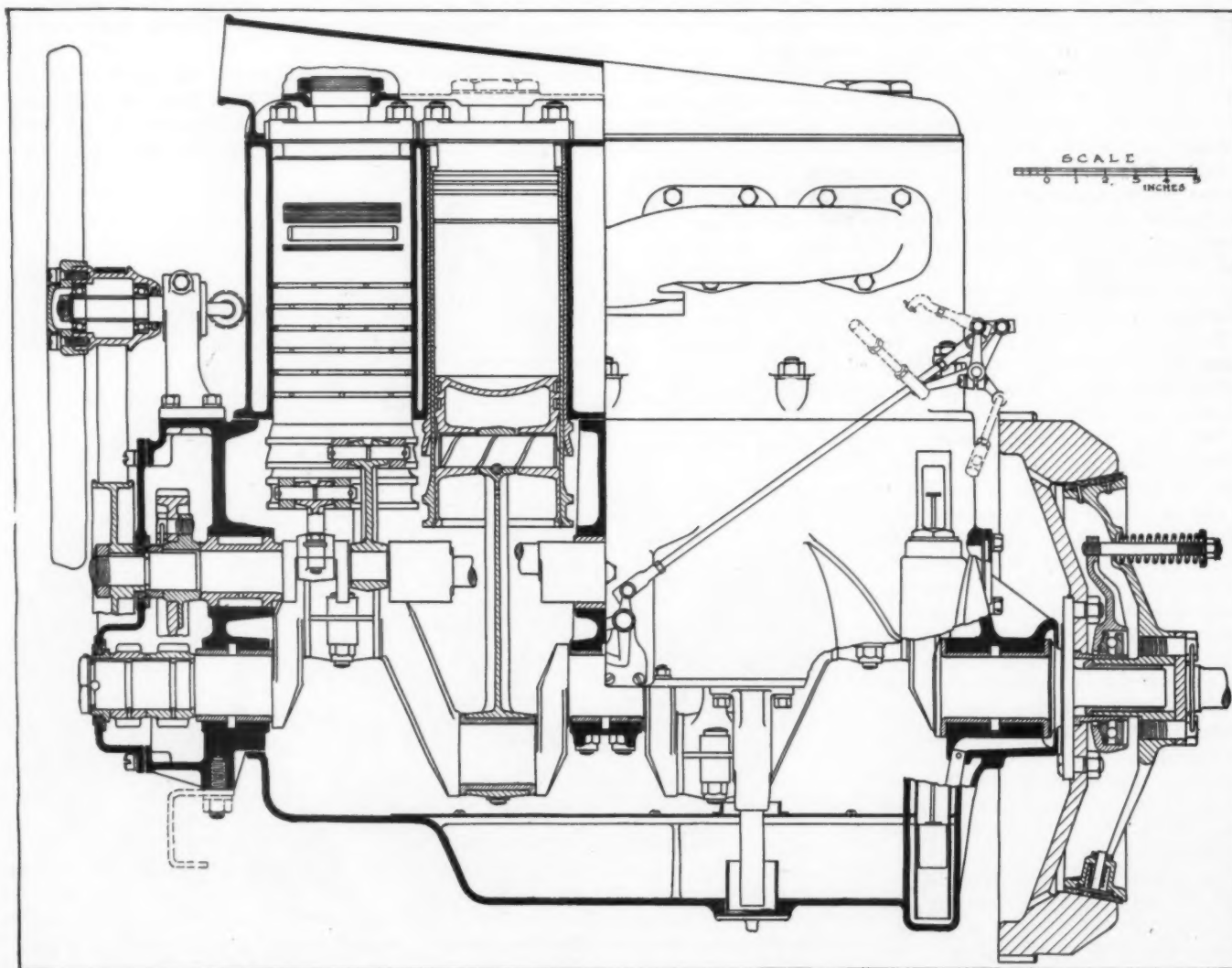
tions holding water. By the Willys construction, water circulates all around the spark plug seat and entirely around the domed cylinder head.

In designing the cooling system, one other point stands out of special importance, and that is the provision for draining the cylinder heads. The head is so shaped that the water syphons from it when the system is emptied. This operation is automatic, and obviates the necessity of removing the heads to get rid of the water when necessary.

The water inlet connection is also unusual in that the inlet pipe from the bottom of the radiator attaches to the lower part of the right side of the upper half of the crankcase. An integral passage in the case leads the water vertically upward to an opening in the bottom of the cylinder casting. The water is thus introduced to the cylinders at the mid-point of the block length, making for equal distribution in either direction, and allowing for the complete surrounding of the cylinders with water throughout their entire length.

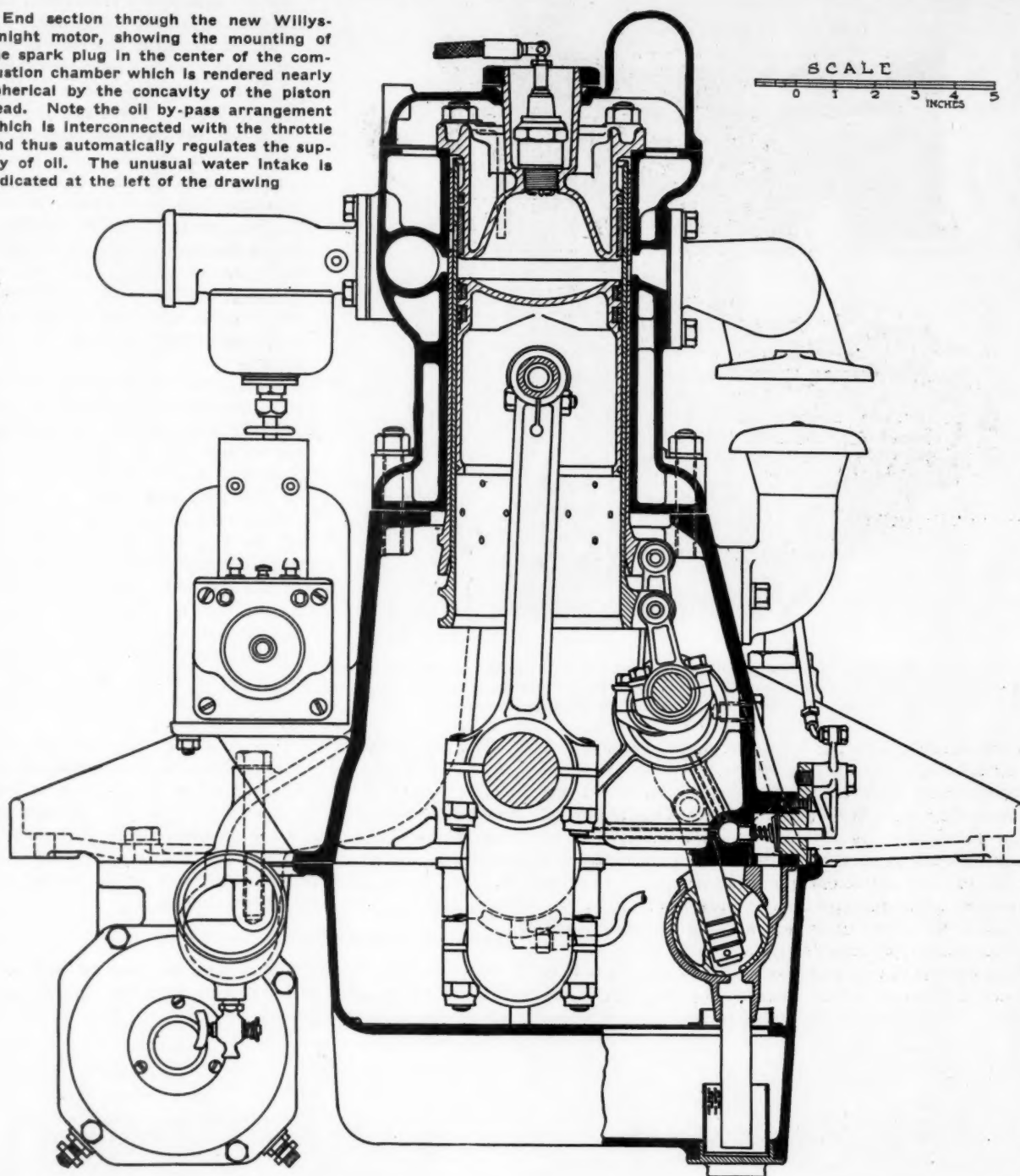
Arrangement of Ports

There is nothing unusual in the working out of the details of the two sliding sleeves and their actuation from an eccentric shaft through the intermediary of short connecting-rods.



Part transverse section through the new Willys-Knight motor, showing layout of crankshaft and also a sectional view through the clutch

End section through the new Willlys-Knight motor, showing the mounting of the spark plug in the center of the combustion chamber which is rendered nearly spherical by the concavity of the piston head. Note the oil by-pass arrangement which is interconnected with the throttle and thus automatically regulates the supply of oil. The unusual water intake is indicated at the left of the drawing



Between the piston and the cylinder wall there are two sleeves, one within the other.

Near the top of each sleeve there are rectangular ports extending part way around the circumference and on opposite sides. In the side of the cylinder there are corresponding slots, that on the left communicating with the exhaust manifold, and on the right with the intake. When, in the slow up and down movement of the sleeves, the slots on the right side of the sleeves register with the opening in the cylinder wall, the intake port is open and there is a clear passage from the manifold to the inside of the cylinder, through the two sleeves. Thus, the three slots in the right side of the cylinder block and sleeves form the intake port, and when they come together the action is the same as when the valve of a poppet motor is raised by the cam.

The area of the intake port measures 1.372 sq. in. Its

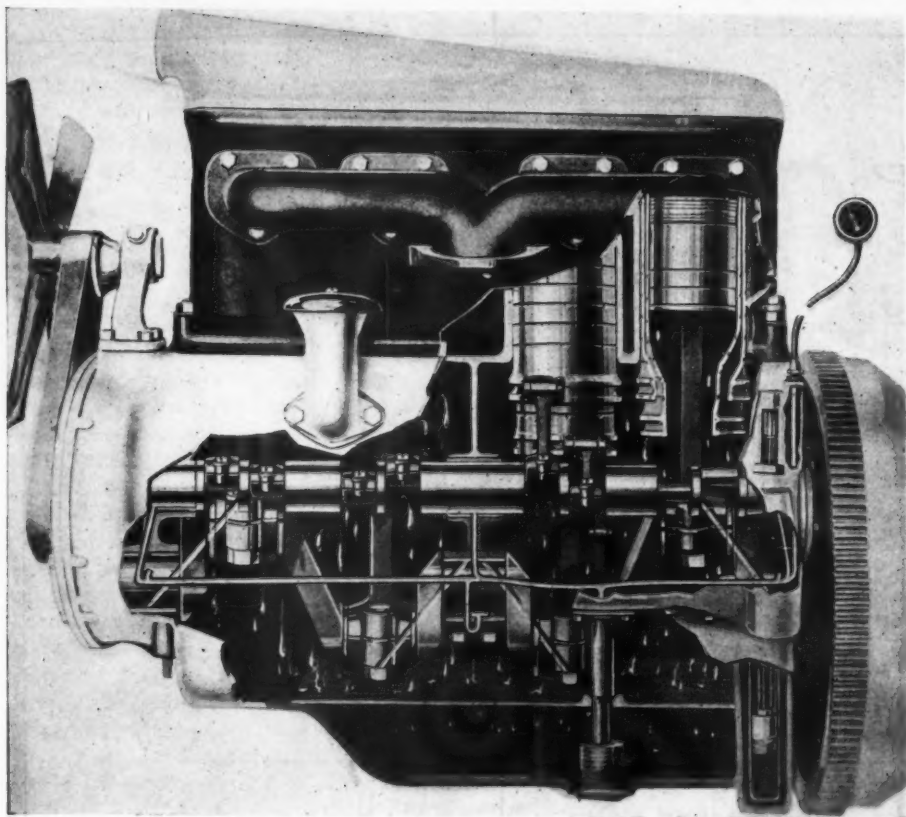
circumferential length is 4 in. and its width is 0.393 in.

The exhaust port is $3\frac{1}{4}$ in. long circumferentially and 0.410 in. wide, giving an area of 1.5875 sq. in., the exhaust port being larger to give free outlet for the burned gases.

Sleeve Travel

The sleeves travel 1 in. at one-half the motor speed. Since the piston stroke is $4\frac{1}{2}$ in., this means that the sleeves travel at only one-ninth of the piston speed, in other words, if the motor is running at 900 r.p.m., the sleeves are only traveling at a rate at which the pistons would travel when the engine is turning over at 100 r.p.m.

The eccentric shaft is driven at one-half the speed of the crankshaft by a silent chain at the front from the crankshaft and from the foregoing it is shown that the opening and closing of the valves cannot vary, but they are operated



Details of lubricating system. Note that the usual splash troughs under the cylinders are absent. The sleeves are grooved and also drilled with 1-8-in. holes at intervals to insure lubrication. Intake vacuum suction tends to lift the oil up between the sleeves

entirely mechanically, differing from the poppet valve which is closed by a spring. Therefore, no matter what the speed of the engine, there is no chance for the sleeves to get out of time, once they have been properly set. This is one of the strong claims of the Knight design, namely, that at speeds running well up over 2000 r.p.m. a proper mixture is obtained, due to the positive opening and closing of the ports in fixed relation to the movement of the pistons.

The exhaust opens 40 deg. before lower dead center, and closes 5 deg. after upper dead center.

The intake opens 6½ deg. after upper dead center, and it is closed 45 deg. after lower dead center. The diagram shows this timing, and indicates the long duration of the valve

opening. The exhaust valve is open for 225 deg. of the revolution, and the intake is open for 218½ deg.

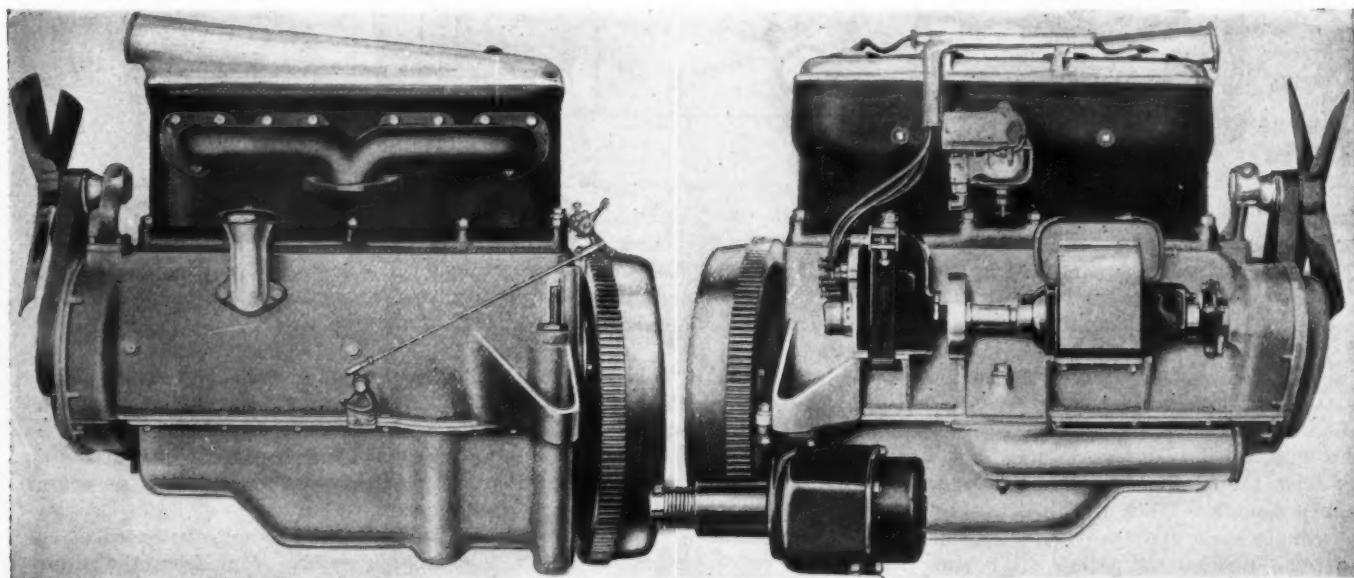
In the design of the sleeves and the rest of the moving parts there is little to distinguish this engine from other Knight types. There are junk rings, so called, between the removable cylinder heads and the inner sleeves so as to prevent the loss of compression through leakage between these two contact surfaces. The sleeve slots are unobstructed, making a free passage for the gases. The compression is held by the junk ring pressing against the inner sleeve and is in no way dependent upon the fit of the sleeves.

From the standpoint of assembling and dismantling, the method of holding the pins used for attaching the connecting-rods to the sleeves is of interest. A small spring ring is fitted to the pin, and when it is slipped through the sleeve bosses and the head of the rod, this ring springs into a groove in the inner surface of the top of the rod end. This groove is open at the top, so that in order to take the pin out, all that is necessary is to use a screwdriver or similar tool to press down on the spring ring until it clears the rod slot, when the pin can be slipped out.

The crankshaft is carried on three main bearings and is of conventional type. Pistons have concave heads, so that a nearly spherical combustion chamber results, due to the piston head shape and the domed form of the cylinder heads. The spherical chamber is the theoretically perfect shape, and the Knight motor affords an opportunity of coming close to it. The spark plug is placed directly in the center of the head, and in a cup already mentioned.

Individual Exhaust Outlets

The exhaust manifold is a separate casting with an individual outlet from each cylinder with the idea of getting rid of the gases as quickly as possible. The intake mani-



Exterior views of both sides of Willlys-Knight motor, showing extreme neatness and simplicity of design

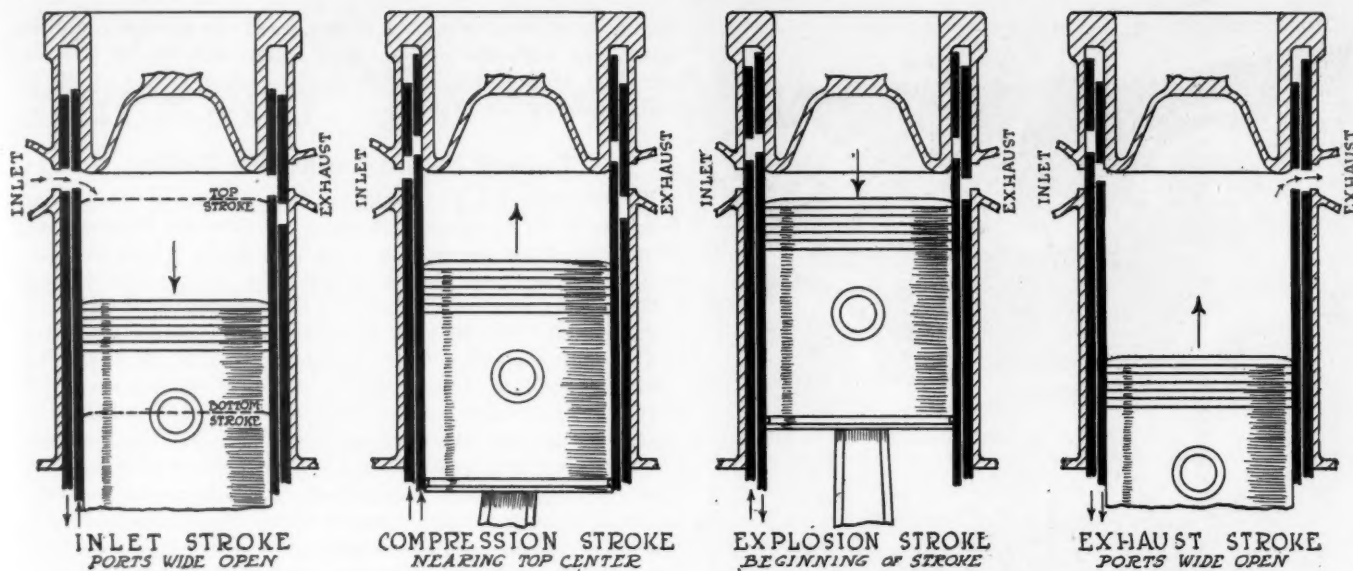


Diagram of sleeve operation at different points of the cycle on the new Willys-Knight four-cylinder block motor

fold is within the cylinder block, no part of it being exposed, the carburetor bolting directly to the casting. Its position is quite high on the block, almost opposite the valves, and this is possible due to the use of the Stewart vacuum fuel feed arrangement.

Lubrication System Simple

Simplicity has been the aim in the designing of the lubricating system. It is called a force feed and splash arrangement. The oil is drawn up from the oil reservoir at the bottom of the crankcase by a unique pump operated from the eccentric shaft and is forced through oil pipes to the crankshaft main bearings, eccentric shaft bearings and chains at the front. The crankshaft webs are drilled, conveying it to the lower rod bearings and the overflow from these is thrown into the sleeves and pistons. Thrown against the skirt of the sleeves, it is carried up between the sleeves through their own action. Circular grooves cut in the outside of each sleeve catch the oil and lift it up, distributing it as the sleeves travel up and down.

Sleeves Drilled for Oiling

The sleeves are drilled with $\frac{1}{8}$ -in. holes at certain intervals, allowing the oil spray below the piston to pass through the inner sleeve to aid lubrication between the sleeves, and also to pass through the outer sleeve to aid in lubricating the contact surface between outer sleeve and cylinder wall. Suction caused by the intake vacuum tends to lift the oil up between the sleeves, doing its part in assisting the oiling.

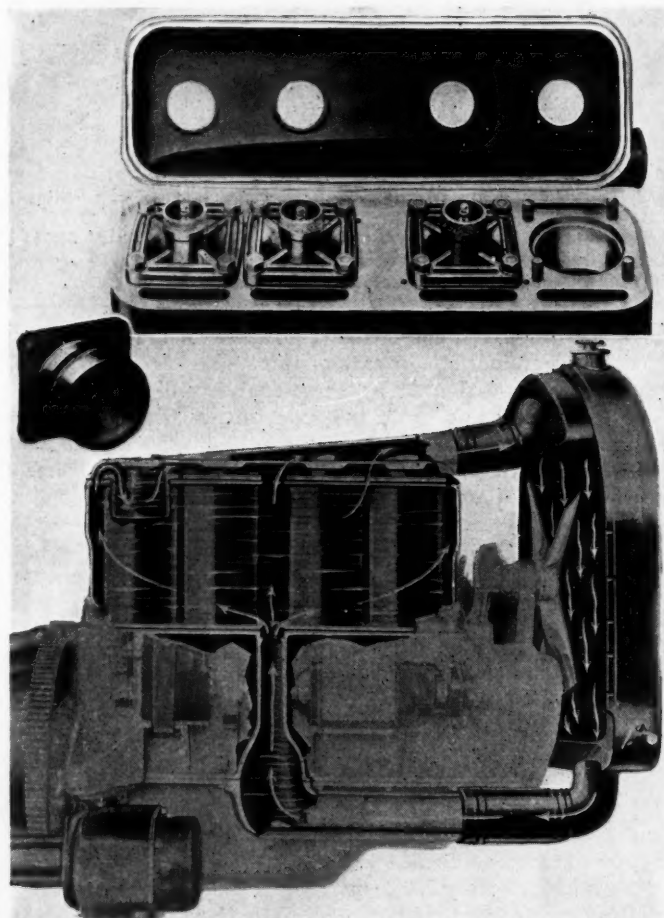
Throttle Regulates Oil Supply

The flow of oil is automatically taken care of by interconnection of an oil by-pass with the throttle. Thus the amount of oil supplied is in proportion to the throttle opening. The pump is so constructed that its entire barrel oscillates as it pumps. This oscillation is taken advantage of to uncover intake and outlet passages, so that no valves are required in the pump, making a simple and efficient device.

The Electric Equipment

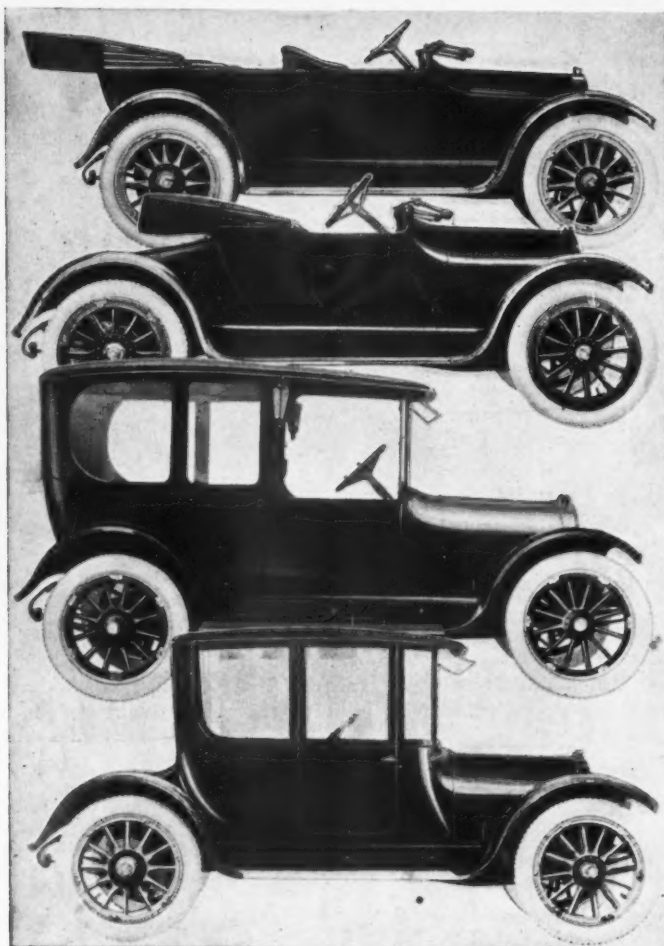
On the right side of the engine are the three electrical units, providing for ignition, starting and lighting. A silent chain, outside of the eccentric-shaft chain, drives the generator shaft at engine speed, and back of the generator is the magneto, both resting on brackets on the crankcase. The starting motor is hung below the right rear supporting arm, and it drives the flywheel through the Bendix connection, which is applied similarly to the other Overland model.

Throughout the chassis and bodies standard Overland practice as used on the six is followed. The drive is through a cone clutch and three-speed gearset to a floating rear axle. The drive shaft, fitted with a universal at the front end, is inclosed within a torsion tube which attaches at its rear



Upper—Illustrating the detachable cylinder head construction of the new Willys-Knight motor and also showing the upper part of the spherical combustion chamber formed by the detachable cylinder head. The cover plate acts as the top of the waterjacket

Lower—Phantom view through the new Willys-Knight engine showing the operation of the water-circulating system



Top—The new Willys-Knight five-passenger touring car selling for \$1,095
 Upper middle—Roadster on the same chassis which lists at \$1,065
 Lower middle—Seven-passenger limousine priced at \$1,750
 Bottom—Coupé model marketed for \$1,500

end to the gearbox. The latter is attached to the rear axle which is a characteristic of cars of this make.

The rear suspension is by three-quarter elliptic springs which are underslung from the axle tubes. These springs measure 48 by 2 in., while the front half-elliptics are 36 by 1 3/4 in. Brakes have plenty of power for the car, the drums having a 14-in. diameter with a width of 2 1/4 in.

Principal Bearing Dimensions

	PISTON	INNER SLEEVE	OUTER SLEEVE
Length connecting rod bearings (center to center).....	10	2 3/16	3 3/4
	FRONT	CENTER	REAR
Length crankshaft bearings.....	2 1/2	2 1/2	3 11/16
Diameter crankshaft bearings.....	2	2	2
Length eccentric shaft bearings.....	2 3/4	2 1/4	2 1/4
Diameter eccentric shaft bearings....	1 3/8	2	2

One Chassis—Four Body Types

All four of the body types, namely, touring car, roadster, coupé and limousine, are fitted to the one chassis, whose wheelbase is 114 in. Bodies follow out the same general lines as others of this make. The upholstery is of leather, and doors are made wide and fit well into their panels. The fenders are crowned, which is always a point that adds to appearance. For the finish, royal blue with ivory striping has been decided upon as standard. Wheels are gray with fenders and trimmings of black enamel.

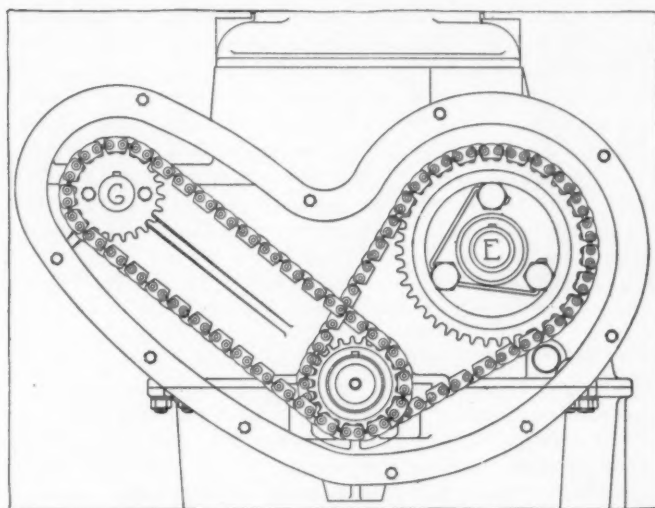
The touring car is the only one of the types which sells for \$1,095. The roadster is still less, priced at \$1,065, while the coupé is \$1,500 and the limousine, a seven-passenger

design, is \$1,750. Needless to say, each car carries complete equipment with the open models fitted with 34 by 4 tires, non-skids in the rear, and the closed cars mounted on 35 by 4 1/2's, non-skid all around.

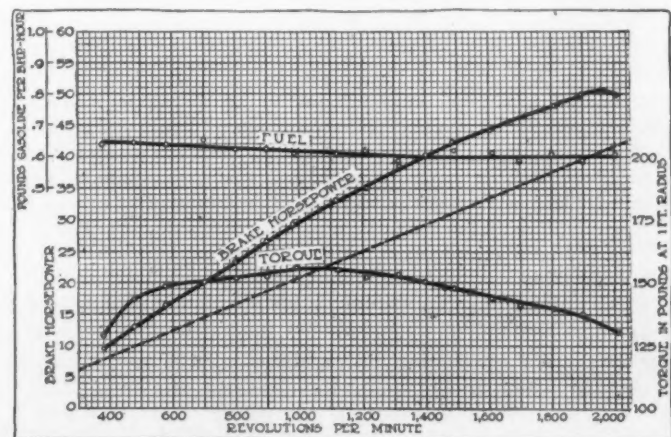
To Issue Circular on Rubber Testing

WASHINGTON, D. C., July 10—The Bureau of Standards, Department of Commerce, is about to issue the third edition of a circular on the testing of rubber goods. This publication, which has been very much enlarged, is fully illustrated, and describes in detail the method of procedure in conducting physical and chemical tests of rubber. The testing machines and apparatus developed at the bureau greatly facilitate the testing of rubber, and the object of this circular is to assist manufacturers and consumers in establishing standard specifications and standard methods of test. The subject matter proper is introduced by a brief outline of the processes through which rubber passes before reaching the factory, followed by a short description of the usual processes of manufacture, which include washing, drying, compounding, "making up" various articles, and vulcanizing. The physical tests most commonly employed are explained very thoroughly. These include tests for tensile strength, ultimate elongation, and elasticity. Conditions affecting the results of tests are discussed at some length and experimental data are given to show the necessity of a standard procedure in testing.

A general discussion of the chemistry of rubber is followed by a brief explanation of the object of each of the analytical determinations that are commonly made. After this are given the methods in use at the bureau.



Layout of the silent chain drive at the front of the new Willys-Knight motor. E is the eccentric and G the generator shaft



Brake horsepower, fuel consumption and torque curves of the Willys-Knight four-cylinder motor

Packard Twelve Makes 72.7 M.P.H. on Chicago Speedway

First Manufacturer's Test on New Board Track Shows 13.3 M.P.G. for Twin-Six in 50-Mile Economy Test—69.8 M.P.H. with Seven Passengers and Top Up

CHICAGO, ILL., July 10—The first use of the Chicago 2-mile board speedway for testing by manufacturers took place to-day when the Packard Motor Car Co. tested its new twelve for economy, speed and other factors, the test being made under the supervision of the American Automobile Assn. with its officials, timers and starters.

The first test to be made was for economy. In a 50-mile run, with top down and windshield up, carrying five passengers, the new Packard twin-six consumed 3 gal., 95½ oz. of gasoline, averaging for the 50 miles, 13.3 miles per gal. The weight of the car with the passengers was 5400 lb.

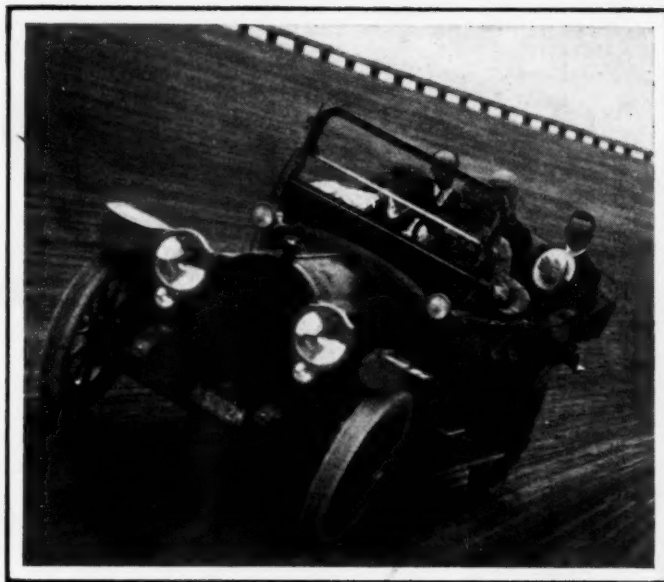
72.7 M.P.H. for 10 Miles

Next, Ralph De Palma, with one passenger, made a 10-mile run, with top down and windshield up, covering the distance in 8 min. and 15 sec., an average of 72.7 m.p.h. Although for a much shorter distance, this betters the record set by the Packard at last year's test by more than 2 m.p.h.

The last test of the day was a 10-mile run with Ralph De Palma driving. He carried six others in the car with him, had the top and windshield up and averaged 69.8 m.p.h. The lap time, as checked by officials on this run was:

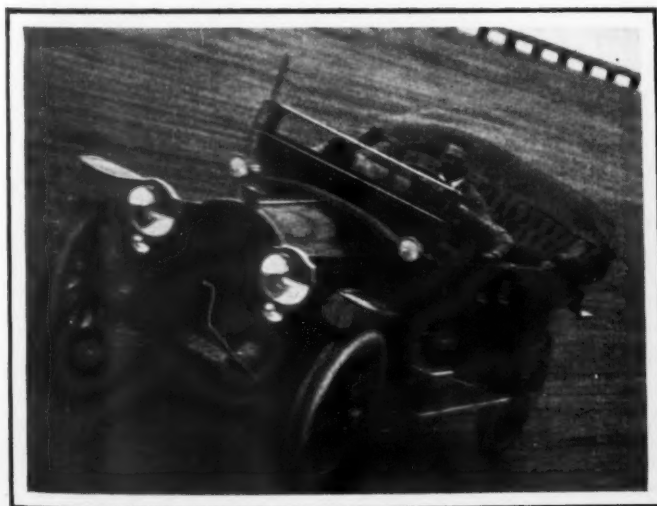
Lap. No.	Time
1	1:43.8
2	1:44.2
3	1:43.8
4	1:43.3
5	1:43.3
Total	8:38.4
Average	69.8 m.p.h.

Both cars were in full touring trim in the trials. Wind resistance proved quite a factor with the top up and undoubtedly the lower average in the latter test as compared with the Indianapolis test last year is accounted for by the fact that in the previous trial in the Hoosier metropolis, the top was down.

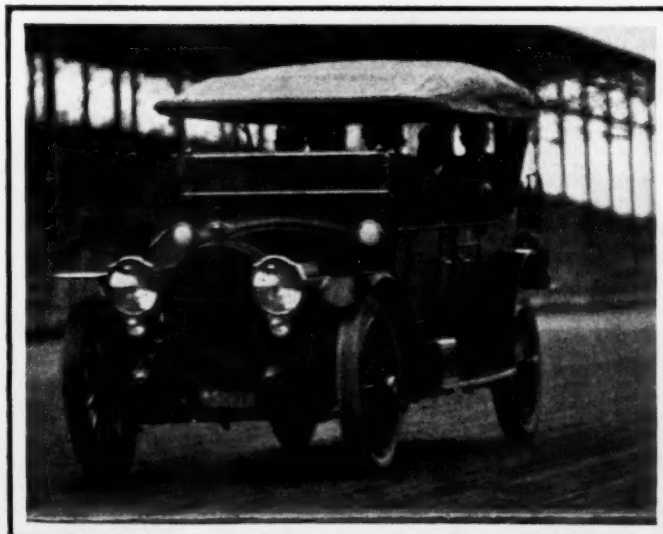


Finish of 10-mile speed test. De Palma driving at 69.8 m.p.h.

One of the cars was shipped direct from the Packard factory at Detroit yesterday, and never had been given any try-out. The other was the twin-six President Joy of the Lincoln Highway Association drove to the Pacific Coast recently. Both carried regulation touring car equipment, including extra tires, and no changes were made in the cars. In other words they were exact duplicates of the cars of this type to be seen in daily use throughout the country.



De Palma averaging 72.7 m.p.h. for 10 miles in Packard twin-six on Chicago speedway



Five-passenger economy test Packard twin-six on a turn. Engineer Vincent driving

Owen Magnetic Makes Progress

Entz Transmission in Chassis Shows Great Improvement
Over Original Design—A New Sort of Motoring

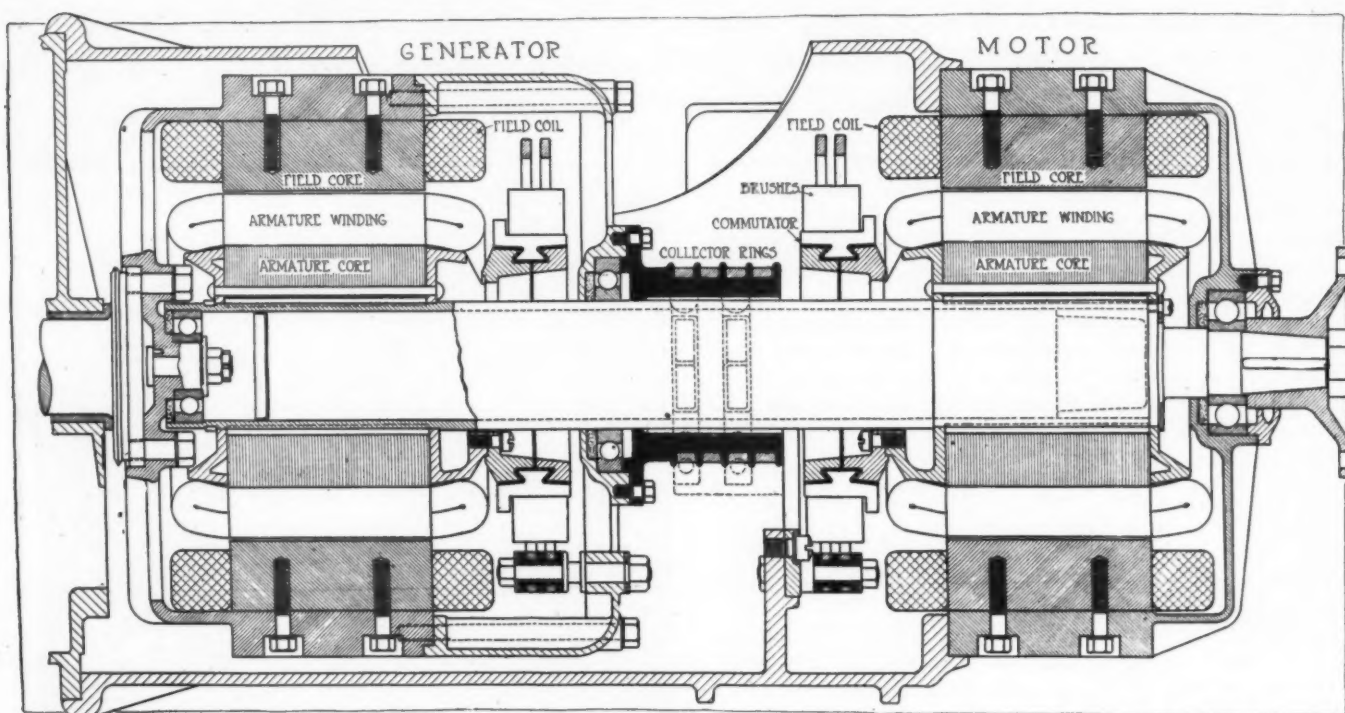


Fig. 1—Section of Owen-Entz transmission. Generator field cores and coils form the gasoline engine flywheel and the collector rings shown are for the purpose of connecting the field current of the generator to the various circuits. The brushes of the generator revolve with the field. The two armatures are identical and both are keyed to the hollow shaft which is attached to the propeller shaft and has no connection with the engine

IN the Owen magnetic transmission car there is never any positive gear connection between the motor and the rear road wheels.

Quite what this means is appreciated, once it is experienced, but to describe in words the effect, from the viewpoint of the ordinary passenger in the car is extremely difficult. If the reader has ever ridden in a wind wagon or a wheeled vehicle driven by an aeroplane motor and aeroplane propeller, he will have some idea of how the Owen car feels to ride in. Or if he has not this experience an idea may be obtained by imagining an immense rubber shaft which is twisted at one end by the motor and drives the axle by untwisting at the other. That is to say there is a perpetually soft cushion between the source of power and the wheel, it is impossible for shock of any sort to be carried from one to the other as the intermediary mechanism forms a sort of energy reservoir always prepared softly to absorb excess power or to give out again extra torque to the axle.

Perhaps it might be said that the magnetic transmission is to the chassis what the pneumatic tire is to the wheel. It does not add so much to the comfort of motoring as does the pneumatic tire compared with a steel tire, but the utter absence of all sense of hardness is very similar to that given by the pneumatic.

The Dual Control

The car handles more as though it had only one speed. There is a throttle pedal which operates normally, and above the steering wheel is a lever very much like the usual throttle lever. If opening up on the accelerator pedal is not

enough to meet the road conditions of traffic or gradient, then the lever is pushed along an inch or two, and the car gathers way just as though a second gas feed had been put into commission or a few more cylinders added to the motor.

An Ever Slipping Clutch

The principle of operation is really that of the clutch. The Entz transmission is an electro-magnetic clutch which is always slipping, sometimes a great deal, sometimes a very little; and the energy dissipated by the slip is caught, to be used up again later on. If a car had a clutch made of some material which could not be burnt nor worn out it would be possible to arrange a transmission by a purely mechanical device for tightening or loosening the grip of the clutch, but if this were done, the instant the clutch began to slip energy would begin to be thrown away in the form of heat. This could not be recovered, and also the more we wanted to use the slip so as to give the effect of a lowered gear ratio the greater the proportion of the power that would be wasted.

The magnetic transmission is a clutch that can be tightened magnetically, but the slip creates electricity instead of heat, and the electricity is used to drive the car. We take the high-speed energy from the motor and apply low-speed energy direct to the axle without any connection save a few stout wires.

Naturally enough, a thing so different from the ordinary creates fear in the mind of the prospective purchaser; he wonders what peculiar tricks it may have that he will not be able to understand, and the electrical part awes him with its bright commutator bars and big brushes. Perhaps the

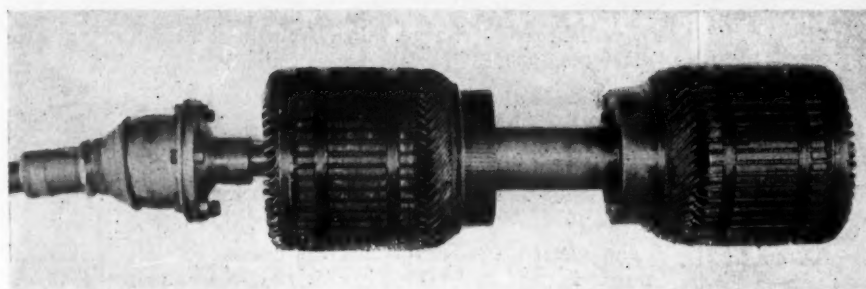
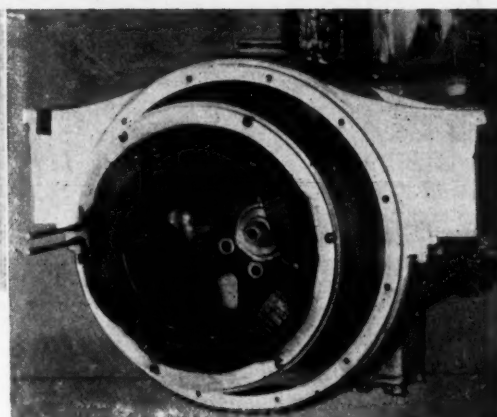


Fig. 2—Left—Armatures of motor and generator attached to propeller shaft
Fig. 3—Right—Field coils, etc., forming flywheel of gasoline motor



simplest way of tackling this point of view is to say that the essentials of the electrical transmission are units of electrical machinery that central station work of nearly two generations has proved good. Added to this is the extremely important point that the brushes and commutator bars which are the only parts of an electric generator that can possibly wear are hardly ever used anything like so hard as they would be in lighting service.

Like all other cars the Owen magnetic does most of its work on high gear and the difference in speed between the electrical moving parts is then only from 60 to 100 r.p.m., as compared with several hundreds of revolutions for a central station dynamo or several thousand for an automobile lighting generator. Obviously so slow a rubbing speed of brush on commutator as this can produce but very little wear indeed so the life of the parts ought to be very great.

Process of Driving

To start the car all there is to do is to pull the lever on the steering wheel into the starting position, which turns the motor over at a high speed, owing to the size and power

of the electrical machines available. Then, without touching the accelerator pedal it is possible to go forward or backward by merely moving the lever on the steering wheel to and fro.

Flexibility Illustrated

One of the most curious effects is that the motor can be used to hold the car on a grade by letting it turn over at an idling speed and putting the lever in a position which allows the maximum slip in the transmission short of complete freedom. A favorite demonstration with the car in order to show the flexibility of the transmission is to drive the car to the middle of a ramp with fairly steep gradient, set the hand lever in a position where the motor can hold the weight of the car against gravity and then go slowly forward or backward by gently opening or closing the throttle. It is not suggested that this ability to use the motor to play with the car on a grade is of much utility, but it is a good way of showing how the transmission is the equivalent of a clutch that can be tightened or loosened by varying the magnetic grip.

Stages of Grip

Turning to the diagram, Fig. 1, the field magnets and coils of the generator form the flywheel of the engine. Neglecting the motor part of the transmission, the armature of the generator is on a shaft running free on a spigot ball bearing in the flywheel and attached at the other end to the drive shaft and so to the bevel pinion of the rear axle.

Thus the field of the generator runs always at engine speed while the armature of the generator runs always at propeller shaft speed.

The effect of running the engine and so spinning the field magnets of the generator is to induce currents in the armature which make a magnetic attraction between the armature and the field. This is equivalent to tightening the fields upon the armature if we follow the clutch analogy, so the armature tries to turn with the field and will do so if the resistance to motion of the car as a whole is not too great. This means that part of the energy in the flywheel of the engine goes to the creation of electric currents in the armature coils, and part to the direct mechanical work of turning the armature and so driving the car.

Now this current that is created in the armature of the generator is taken to the second part of the transmission which is an electric motor. This is also shown in Fig. 1 and its field magnets are fixed stationary while the armature is keyed to the same shaft as the armature of the generator. Thus whatever else happens the two armatures are always running at the same speed and that speed is the speed of the propeller shaft.

Circuits One by One

On the foot of the steering column there is an aluminum case containing sundry resistance coils and a switch or two.

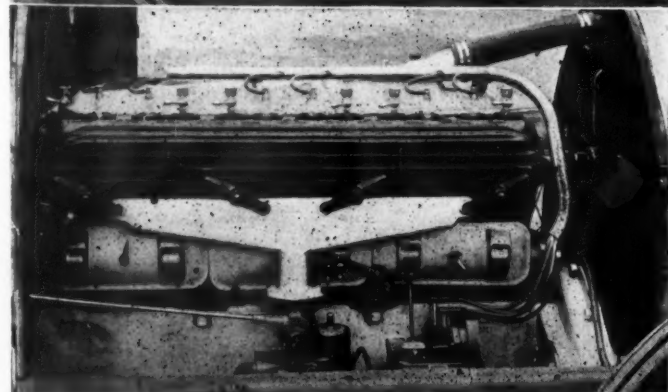
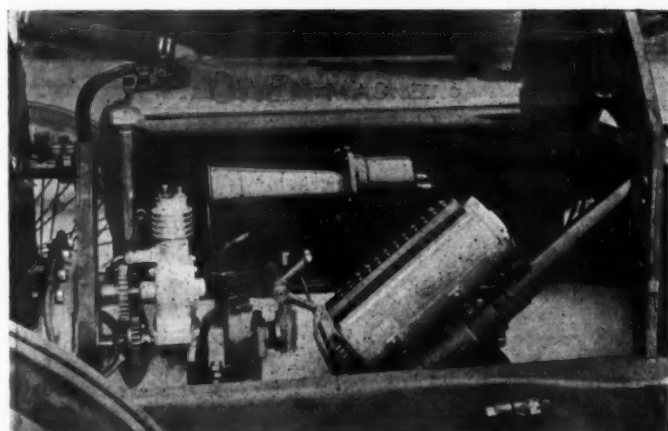


Fig. 4—Upper—Controller box at base of steering column, showing gear connection. This box contains all switches and resistance coils
Fig. 5—Lower—Buda motor in Owen Magnetic chassis

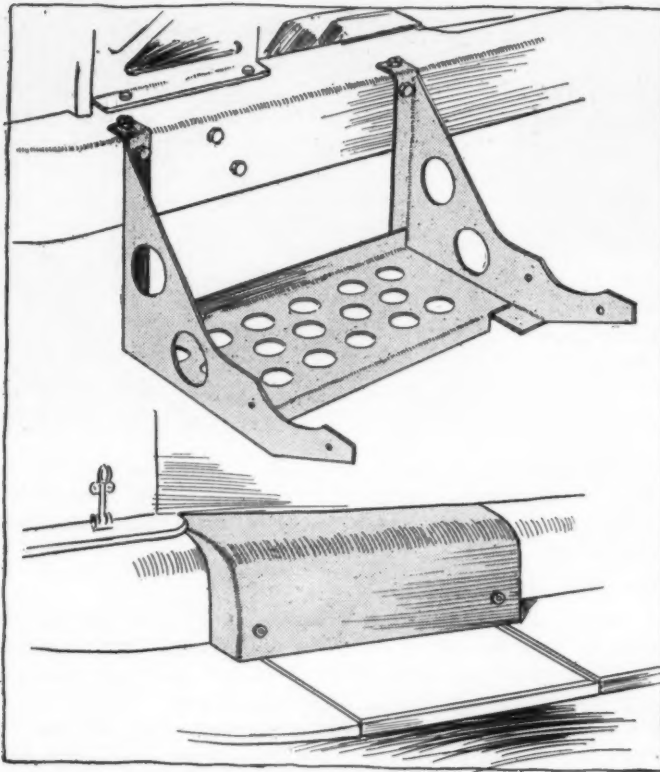


Fig. 6—Upper—Steel cradle attached to chassis side member for support of battery

Fig. 7—Lower—An instance of the neatness of the car. The battery cover on the running board. This is attached by two nuts and a portion of the board slides out if it is desired to remove the battery completely

The parts are of robust size and comprise the whole of the control. In the following the effect of moving the lever on the wheel is described in electrical terms and the description should be read with continuous reference to Fig. 1, remembering all the while that:

- a—The generator field runs at engine speed.
- b—The motor field is stationary.
- c—Both armatures revolve together at drive shaft speed.

Neutral Position

All circuits are open and there is no current being generated or used. The battery is idle unless in use on the lamp circuit at night.

Cranking Position

Current from the battery is switched into the generator causing the latter to behave as a motor and spin the engine.

Charging Position

Small boosting charge taken from generator and put into battery, only used if battery is accidentally low.

First Car Motion

Generator field windings connected through resistance thus causes gentle excitation and prepares the generator for larger current demands.

Second Position Equals Lowest Gear

The generator field is short circuited so that maximum current is produced. This causes the field to grip the armature and also sends current from the generator to the motor part of transmission where it assists to drive car. Battery is totally out of use.

Third Position

Resistance is switched into the field coils of motor, so throwing a greater load on the generator which is equivalent to tightening the magnetic grip on the armature.

Fourth Position

It is similar to last only more resistance is put into the motor field. Successive positions act in the same way till we come to the seventh and last.

High-Gear Position

As in the first-speed position the generator field is shorted, but instead of current being sent to the motor none is switched into any outside circuit whatever. This gives the greatest possible grip because all the current generated is used to attract the armature and drag it around. This high-gear position is paradoxical to some extent because the effect of the grip caused by the current is to reduce the current. That this is so can be seen when it is remembered that the amount of current is proportional to the relative speeds of the generator fields and the generator armature. When these are, say, 1060 and 1000 r.p.m., the relative motion is only 60 r.p.m. and the current generated very small, but just enough to maintain the grip. If we now strike a road resistance like a grade the relative motion increases, the current increases and the grip increases so the clutch tightens itself up automatically to suit the road conditions.

In the high-gear position we have explained that no current is sent to the motor; on the contrary, a special small shunt winding on the motor field is switched into circuit and thenceforward the motor delivers a charging current to the battery.

Electric Brake

An accidental feature of the transmission is to provide an extremely powerful electric brake which automatically releases as the car slows down. It cannot be used for stopping the car altogether because its power depends upon motion of the vehicle, but it is very effective when the car is traveling fast. If the lever be put into the neutral position when the car is running the heavy current induced by the motion of the car in the series winding of the electric motor is turned into the resistance coil employed in the charging position which is used for boosting the battery, as explained above. On a steep grade this electric brake will keep

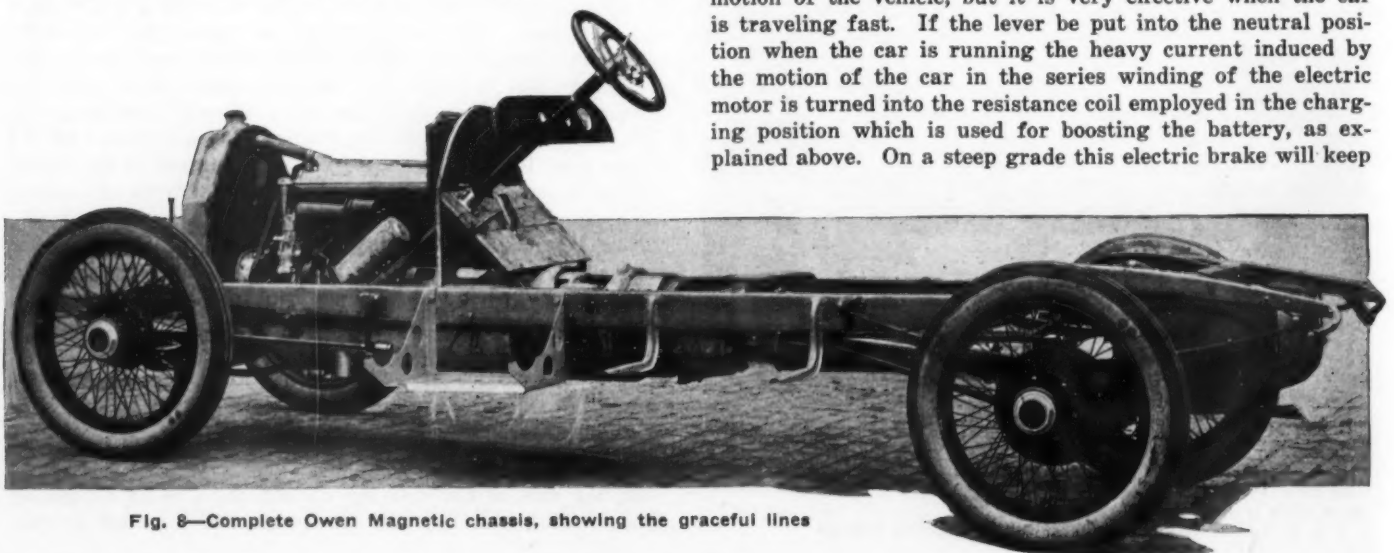


Fig. 8—Complete Owen Magnetic chassis, showing the graceful lines

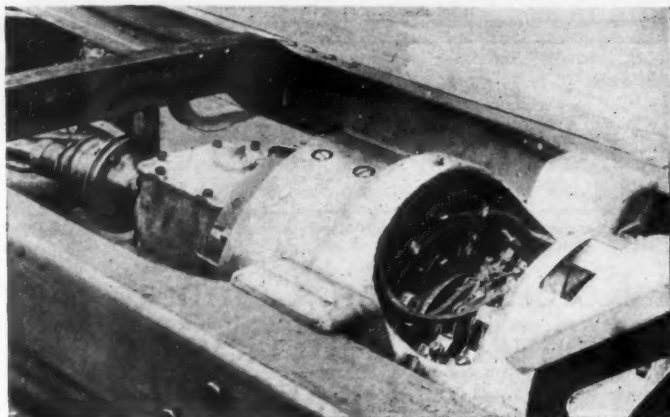


Fig. 9—Complete transmission in place in the chassis, showing accessibility of brush gear

down the speed of the car to 15 or 20 miles an hour, and so it is very useful. Of course it has no wearing parts.

So much for the electrical system; the description is sufficient for anyone who knows a little electrical science and no amount of description will make the detail operation clear to a man who has no electrical knowledge whatever.

Made from Good Components

Desiring to give the transmission the very best opportunity to exhibit its advantages in the hands of users accustomed to the best sorts of automobiles, the Owen company selected for the chassis the parts which it thought would be reliable. For the motor a six-cylinder Buda is used, tested twice by its makers and delivered under a contract that provides for a class of finish usually reserved for exhibitions, and a final inspection after all ordinary inspecting processes are over. Magneto ignition is used, not because the electric energy of the battery could not be employed, but because the magneto makes the motor a separate unit complete in itself.

The rear axle is made by the American Ball Bearing Co., with spiral-bevel drive and very large brakes of the expanding type, totally enclosed. Steering gear and front axle are similarly good and every detail fitting is of the very best quality. In the design of the springs the engineers of the Perfection Spring Co. were given a free hand and the result is remarkably easy suspension with semi-elliptics all around. In designing the radiator the honeycomb, pointed type used

for years by Mercedes and Austro-Daimler has been kept in mind, and the bodies are costly hand-made jobs with lines that are in keeping with the chassis.

The engine and the aluminum-housed transmission together make a unit power plant, and connection to the rear axle is through an open-type propeller shaft with two universals. On some of the cars which are intended for long-distance touring a two-speed gear transmission has been added to the rear axle so that the whole electrical range of speeds may be available with either a high or a low axle ratio. Normally a bevel ratio of about 3.5 to 1 suffices and the Pennsylvania mountain roads have been tackled on this gear.

Since the transmission was described in *THE AUTOMOBILE* a little more than a year ago it has not been changed in principle, but the car has been changed a good deal. Instead of being an experimental vehicle with the noticeable crudities of experimental jobs, it is a handsome car with a well-designed and proportioned chassis.

Thus described the chassis sounds simple enough, as it certainly is. There is no mystery about the action of the transmission whatever. What cannot be put into words is the really remarkable difference between driving a car with this transmission and an ordinary car. One most curious effect is that if the foot is taken off the accelerator pedal the effect is equivalent to releasing the clutch of an ordinary car. The motor is totally disconnected as soon as the magnetic grip lets go and this it practically does as soon as it gets down to idling speed. Downhill, then, the car coasts freely and in pulling up on the level the throttle can be shut much further from the place where it is desired to stop, since there is no frictional resistance offered by the motor as it slows to idling speed.

While all ordinary hills can be taken without touching the control, the wide range of speeds allows a very rapid acceleration up hill if starting on the grade because the engine can be allowed to run up to 1000 revolutions or so and then the control slowly pushed forward. As step by step it passes the engine speed holds more or less constant at its power peak position and the car gathers speed.

To handle this car is an experience that would be enjoyed immensely by any driver of experience because it provides a really new sensation. Though easy to handle there are many little things which can be learned and which help to get the very best out of the car and there is a great fascination in controlling with a touch of the finger instead of with combined action of hand, foot and eye.

Beck Jitney Bus Has Steel Body

A vehicle which is suitable for either hotel bus or jitney work with a body having a passenger capacity of ten or twelve has been brought out by Beck & Son, of Cedar Rapids, Iowa. It has a rated capacity of 2,000 pounds and is an assembled design throughout with a special body built of steel. As shown in the accompanying illustration, this is a drop-window design with a rear step. It is upholstered throughout in leather and is weather-proof.

The power plant is a Continental, 3.5 by 5 design with the four cylinders cast in a single block. Other specifications of the motor include a three-bearing crankshaft, splash lubricating system and thermo-syphon cooling. The power is delivered through a twelve-plate disk clutch to a three-speed gearset. Throughout, the drive is standard, being taken through two universal joints to an internal gear rear axle having a ratio of 6.5 to 1. The wheelbase is 124 inches, the tread standard and the tires are solid 35 by 3 front and 35 by 3.5 rear. Pneumatics 35 by 5 will be furnished at an extra cost of \$50. The car is fully equipped for electric lighting having a 100-ampere hour storage battery.



Combination jitney and hotel bus brought out by Beck & Sons, Cedar Rapids, Iowa. It has a capacity of 2,000 lbs.

• The Engineers' Forum •

American-Built Motors of Recent Design Compare Favorably with European Products—Both Develop Over 12 Horsepower Per Liter Displacement

By Chester S. Ricker, M. E.

INDIANAPOLIS, Ind.—Editor THE AUTOMOBILE:—The first article by S. Gerster on Europe's High-Efficiency Motor in THE AUTOMOBILE for April 15 is exceedingly interesting as it brings up some very pertinent questions in regard to motor speeds. Mr. Gerster gives racing motors an average piston speed of 59 to 65 feet per second and touring car motors 46 to 52 feet per second in the paragraphs which apply to this factor in motor efficiency.

It is very interesting to compare some curves which were published under Mr. Charles Y. Knight's name in THE AUTOMOBILE for December 4, 1913, with curves of some later motors, such as have been brought out during the past year. One of these motors is an eight, the other a four-cylinder. It is particularly interesting to make these comparisons after reading Mr. Gerster's article because it gives one a concrete answer to the question, "How near do American motors approach the best European practice?"

Power Per Liter Displacement

The only way that the writer knows by which motors of varying sizes and strokes may be directly compared is to plot curves between piston speed and horsepower per liter. While it would seem more logical in this country to use cubic inches per horsepower as one of the units, it is more convenient to employ the liter displacement unit in order to make direct comparisons with European figures. In Mr. Knight's

power curves r.p.m., instead of piston speed, is made the abscissae, but that is hardly fair to either long or short stroke motors, so his curves, A, B, C, D, E in the accompanying plot have been corrected to read feet per second instead of r.p.m. Otherwise no changes have been made in his curves and in addition curves, F, G, H, I have been added.

Official Tests of Eight and Four

Curves F and G are particularly interesting as they are the official test results obtained from the Automobile Club of America tests on the two motors in question. The curves, H and I are equally interesting because they are representative of two entirely new developments in commercial motor design. The first one is that of the new Herschell-Spillman eight-cylinder V motor, while the second curve is that of a four cylinder T-head motor with four valves per cylinder. The latter motor has been in hard service for over a year in quite a number of motor boats, one in particular being the U. S. Navy record-breaking Hydroplane. In this service it runs normally at 75 per cent. of its maximum power, yet at that speed it delivers 12.3 horsepower per liter of displacement, which is considered very high.

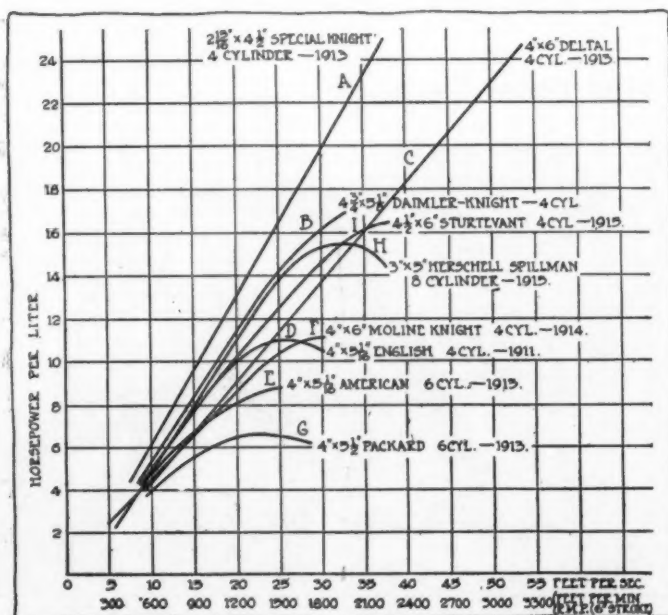
Consideration of the Curves

Curve A. This curve was made by a small special Silent Knight motor having 126 cubic inches displacement, 2.016 liters and developing 50 horsepower at 3,000 r.p.m. The bore and stroke of the motor were 75 by 114 millimeters. Its maximum piston speed was, therefore, 37.5 feet per second. It also raises the question in the writer's mind as to how much more power this motor would have developed had it been carried up to 50 or 60 feet per second, as Mr. Gerster states can be done in racing practice. Suffice it to say, that the Knight motor performance has the characteristics towards which all other motor builders are striving. But this curve represents a motor which is not commercial so we must turn to one which is.

Curve B. This is much more nearly a standard of Knight practice in commercial motors, but Mr. Knight states that the maximum efficiency of this motor, 16.75 horsepower per liter, was obtained at 2,200 r.p.m. and that two carbureters were used, two Zenith carbureters being the only non-standard feature of the motor.

Eight Develops 70 H.P. at 2,380 R.P.M.

Curve H. The third highest curve is that of the Herschell-Spillman eight-cylinder motor. This motor developed a maximum horsepower of 70 at 2,380 r.p.m. at which point its efficiency of performance was 15.5 horsepower per liter of displacement. The cylinders have 3-inch bore and 5-inch stroke, giving a displacement of 282.4 cubic inches or 4.518 liters. The test was made with the motor equipped with



Curves indicating the brake horsepower developed by different motors under test

Westinghouse ignition and Zenith eight-cylinder type of carbureter. The latter was fitted with No. 21 Venturi tube, No. 120 jet, No. 115 compensator and No. 50 well. It is very interesting to note how closely this curve parallels that of the standard Knight curve, B. It shows that this motor runs just a little faster in order to accomplish the same results. If the valves were only a bit larger this motor would probably duplicate the Knight performance.

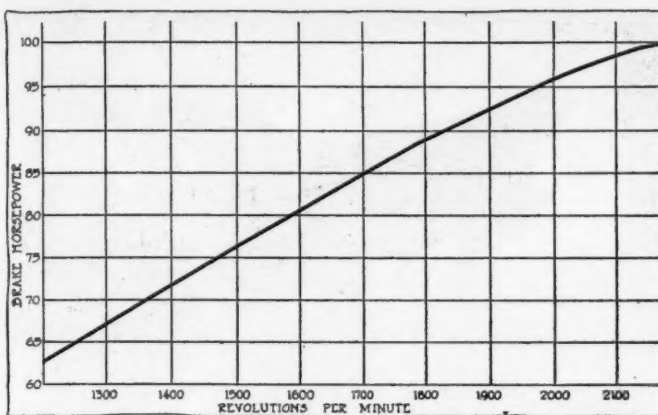
Curve I. The Sturtevant motor seems to be a continuation of the Curve D which was taken from some anonymous English motor. It does not show such a rapid increase in efficiency as the eight but reaches a bit higher output, the best performance of this motor being reached at 2,150 r.p.m. when it develops 100.5 horsepower or 16.4 horsepower per liter. But this motor is designed to run normally at an output of 12.5 horsepower per liter and does it. The next best efficiency for long running is found in the Moline-Knight Curve F, which has a maximum output of 11.1 horsepower per liter, at 28.6 feet per second. During the 300-hour test at the Automobile Club of America it developed only 7.94 horsepower per liter when running at an average speed of 18.6 feet per second for the whole test.

Curves D, E, F, and G are used merely for comparison.

Some Details of Sturtevant Motor

The Sturtevant motor has a T-head cylinder like that shown in Fig. 6, of Mr. Gerster's article only the valves have vertical stems instead of inclined ones. The bore and stroke are 4.5 by 6 inches, respectively, the displacement being 381.6 cubic inches, or 6.105 liters. At 1,475 r.p.m. or 24.6 feet per second piston speed, this motor develops 75 horsepower, or 12.3 horsepower per liter. At 2,150 r.p.m. or 35.9 feet per second it develops 100.5 horsepower or 16.4 horsepower per liter.

The motor is not freakish in construction and surprisingly light for a marine engine. It weighs only 650 pounds, including the reversing gear mechanism, clutch and elevated starting crank. The valve diameter, clear, port opening, is 1 13-16 inches. All the valves have a 7-16-inch lift and a 45-degree seat. The valve timing is not unusual except that

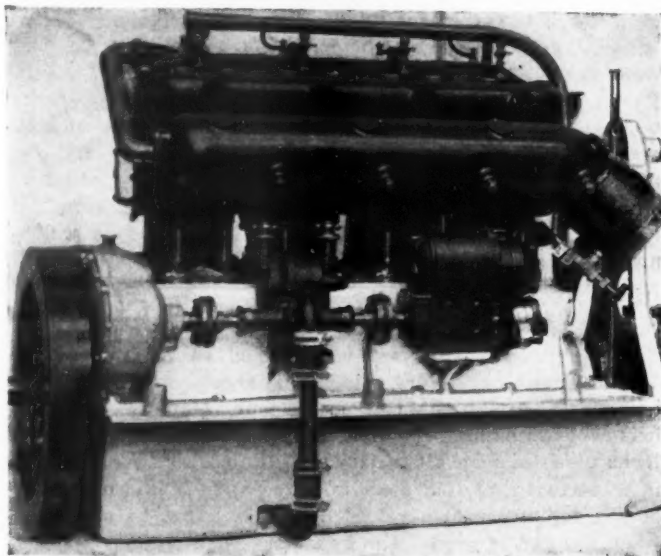


Brake horsepower curve of the four-cylinder Sturtevant marine motor model E-4

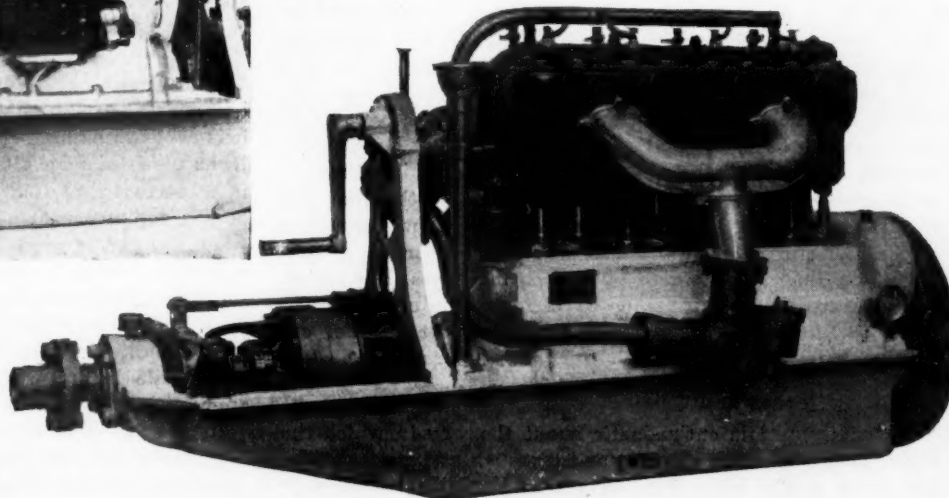
the inlet and exhaust valves are overlapped. This, however, has been practiced on T-head motors for a long time. The exhaust valves open 45 degrees ahead of bottom center and close 10 degrees after top center. The inlet valves open on top center, thus overlapping the exhaust 10 degrees, and close 30 degrees past bottom center. The compression ratio is 4.5 to 1. All of these motors are equipped with a standard 2-inch Zenith carbureter, this size having been found to give the maximum performance. The reciprocating parts are especially light, considering that the pistons have three rings and are made of cast iron. The piston pins turn in the piston bosses which are bushed with bronze. Still the pistons, with rings and piston pin, weigh 1,150 grams or 2.54 pounds and the connecting-rods weigh 1,180 grams or 2.6 pounds. The total weight of reciprocating parts, therefore, is only 3.84 pounds. These tests were made with Bosch ZR magneto and only one set of spark plugs over the intake valves. It is quite possible that this motor would have developed more power if two spark plugs had been used.

Conclusions

From the above, it seems that we are building motors in this country that show up very well with European commercial products, although both of these motors only have a maximum speed of about 37.5 feet per second and a normal running speed of about 25 feet per second. Both of these motors can develop better than 12 horsepower per liter displacement, which seems from this data to be the average towards which we ought to strive—this power output to be obtained at not over 25 feet per second piston speed. It will be noted that the eight-cylinder motor develops nearly 14 horsepower per liter at this speed.—CHESTER S. RICKER, M. E.



Above—Exhaust side of four-cylinder Sturtevant marine motor, showing mounting of magneto and pump. Right—Intake side of the same power plant. Carbureter is mounted at an angle to allow for the slant of the motor when in a boat. Note large manifold and hot air connection





A Jefferly quad hauling a Krupp gun belonging to the Belgian army through northern France

War Trucks and Tractors Well Tested

Organization Excellent—Guns on Four-Wheel Drive Chassis

By W. F. Bradley,

European Representative of THE AUTOMOBILE.

PARIS, June 21—After several months spent in France and Belgium in the respective interests of the Jefferly and the Knox companies, Messrs. H. C. Hill and H. F. Blanchard will sail from Bordeaux for New York next Saturday. Mr. Blanchard has demonstrated the Knox tractor to the French army authorities, and after tests on gradients officially certified to have 12, 16 and 19.7 per cent, has convinced the authorities of the value of his vehicle and has been given the desired contract. Mr. Hill is leaving behind in France about 2,000 Jefferly quads and trucks and fifty Jefferly quads in Belgium. In addition, England has 100 and Russia 400 quads.

French Army Trucks Well Manned

"Before coming over here," said Mr. Blanchard to THE AUTOMOBILE representative, "I was filled with stories about disorganization in the French army. According to these reports all the men who knew anything about automobiles had been sent into the trenches and green men were being broken in to handle trucks. It was stated that everywhere there was a square peg in a round hole. Well, I have seen something of French military matters, and I want to say that they have some organization. Everywhere I have been the officers and men have been leading engineers from good factories such as the Delaunay-Belleville, Panhard, De Dion Bouton, Delage and Peugeot, who know everything there is to be known about an automobile. Up at Havre the man who receives and tests American trucks is Adjutant Lemale, a clever Delaunay-Belleville engineer and inventor of a wonderful gasoline turbine used in French torpedoes. His assistant was attached to the Darracq factory. The chief French buyer is Lieutenant Lumet, who holds the post of chief engineer at the Automobile Club of France laboratory."

Tested in Ditches and Over Hills

Mr. Blanchard is enthusiastic about the way in which the French organize their convoys and test men and trucks. The American trucks come from Havre to Versailles in convoys

of forty. In Versailles they are individually examined and fitted out, two drivers are put on each truck or tractor and they are sent where required at the front in convoys of twenty. Each convoy is in charge of a lieutenant on a touring car, and one of the trucks is equipped as a repair shop, and another carries the cooking stove for the men. Mr. Blanchard says that he had the good luck to be present at the final test of a dozen convoys of all-drive tractors, comprising Jefferly quads, Panhard, Renault and Latil four-wheel drivers. They were taken over the hilliest and roughest country around Paris. The Jefferys had to go through a ditch so deep that when the nose of the first machine was down the starting crank was broken off. The crank was fastened up and each machine went through the ditch with a clearance at the front when the rear was elevated of not more than a couple of inches. This test was for the benefit of drivers as well as machines, and no green man could possibly get through it without detection.

75-Mm. Guns on Jefferly Quads

The French government has formed twelve batteries of 75 mm. guns on Jefferly quads. The gun, which weighs 2 tons, has a special mounting on the truck platform, and when it is about to be fired the chassis is raised by means of special jacks so as to take all the load off the springs. The system is so perfect that if a piece of note paper is laid on the top of the supplementary coil springs it will not be shaken off when the gun is fired. The gun kicks back against a special hydraulic brake, the nature of which is a secret, and returns to its original position without varying a thousandth of an inch. There are four guns in each battery, or forty-eight guns mounted in this way. In addition, each gun-bearing automobile is attended by a second Jefferly quad carrying ammunition.

In addition to France, Mr. Hill has transacted business with the Belgian government. Practical tests, in which the Jefferly quad had to haul a heavy Krupp gun, were made in rough

Connecticut Battery Ignition for Fords

System Mounted on Interchangeable Timing Gear Cover Plate

MERIDEN, CONN., July 10—The Connecticut Telephone & Electric Co., this city, has brought out an edition of the Connecticut ignition system especially adapted to Ford cars. The complete outfit, including wiring and everything except the battery, sells for \$28.50 and one of the features of its construction is that it can be quickly installed upon any Ford car. As shown in the accompanying illustration, the plate which fits over the timing gears of the Ford at the upper front portion of the crankcase is replaced by another which is interchangeable with it but which contains the vertical shaft for the timer distributor together with the bevel gear drive necessary for operating it. On a bracket, integral with this same plate, the single unit coil, which is a high-tension, non-vibrating design, is also mounted and connected to the timer distributor by short wires.

The remaining unit is a switch which includes the Connecticut feature of disconnecting the battery, should the switch be left in the on position with the motor not running. The automatic release is effected by a small rheostat which becomes heated from the continuous current passing through it from the battery and bends over, making contact with a small buzzer coil arrangement which in turn kicks the switch out of contact. It is thus impossible to run down the battery by accidentally leaving the switch turned on.

Switch Flush with Dash

Another feature of the switch is that it sets flush with the dash, having only the control buttons on their metal plate visible on the driver's side. The coil being mounted on the new timing gear cover plate which replaces the old one does away with an awkward mounting on the dash of this instrument, thereby permitting a neat layout which can be easily installed with the tools in the ordinary kit.

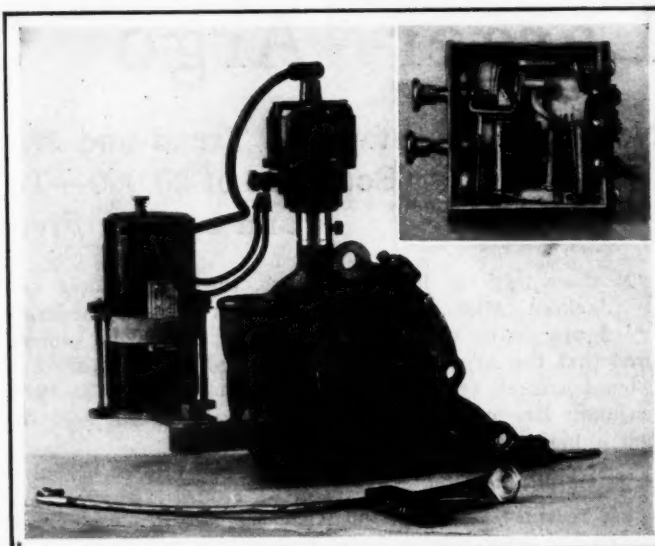
The Connecticut system operates on the open circuit scheme, the interrupter being so constructed that the primary circuit of the coil is completely saturated before the breaking point is reached in order to produce a spark of maximum intensity upon the interruption of the circuit.

It is claimed that with this system, both electrical and mechanical lag have been eliminated throughout the entire range of motor speed. The breaker mechanism consists of an arm carrying one contact piece, a stationary block carrying the other, an insulated roller carried upon the arm and a cam mounted upon the driving shaft. On the driving cam there are four high spots for the Ford outfit, each of them being 90 deg. from the next. This allows a period for maximum saturation.

Synchronism of ignition, or that quality which allows the spark to occur at the same relative part of the stroke, is obtained by the elimination of the electrical lag due to the intensity of the induced current. In other words, for all practical purposes, the spark occurs at the same position as



The system as it appears mounted on a Ford motor



Units of Connecticut Ford system. Insert—Flush dash switch

regards piston travel regardless of the speed of the engine.

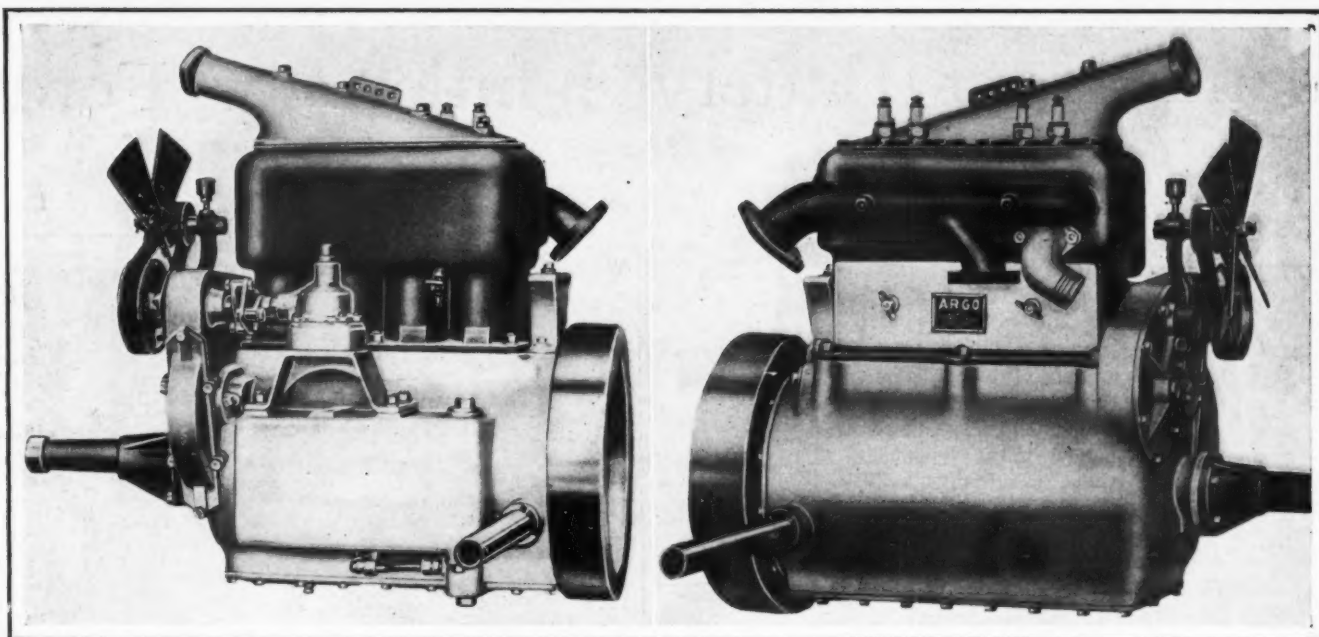
The wiring of the system is very simple and by following the directions with the outfit, even an amateur motorist will have no trouble in installing the outfit. The current is taken from the coil lead to the central point of the distributor mechanism and from there carried by means of a brush, to the high-tension terminals from where the current is taken on the high-tension lead directly to the spark plug.

A. J. Picard & Co., New York City, are the exclusive distributors for the new system.

country between Calais and Dunkirk. These guns were supplied by Krupp to the Belgian army some time before the war. They were found to be most efficient weapons, but when the ammunition which had been furnished by the German firm was exhausted no more was available. This difficulty has been overcome by making special shells for these guns in the French factories. The Krupp gun was dragged into difficult positions by five teams of four horses each and had to be got

out by one tractor. This was accomplished in every case, and the Belgian army has now secured fifty quads, all of which are used for hauling guns.

In addition to the quads, Jeffery has delivered 1,000 $\frac{3}{4}$ -ton trucks to the French government for ambulance work. These chassis have pneumatic tires, twins at the rear and singles at the front, and bodies are fitted in France to meet various requirements in this field of military work.



Both sides of the Argo four-cylinder 23-4 by 41-2 in. block motor. Note the steel tubing rear support

Larger Argo Chassis for 1916

New Car Has Standard Tread and $2\frac{3}{4}$ by $4\frac{1}{2}$ Four-Cylinder Motor—Production Schedule of 20,000—To Sell for \$385 as Roadster and \$435 as Five-Passenger Touring

IN these days of low-priced cars, the Argo Motor Co., Jackson, Mich., still is conspicuous for the moderate figure set on the cars of its make. It will be remembered that the Argo company was formed several years ago to build a small type of roadster with 44-in. tread at \$295, Benjamin Briscoe and his associates realizing the field for such a moderate-priced machine.

Large Output Planned

Just recently, however, the Argo company brought out a new chassis with standard tread which incorporates a number of improvements and differences over the first model. The new roadster is a very nicely designed car of the lighter type and is built to sell at \$385, while on the same chassis, a neat five-passenger body is fitted, the price in this form being \$435. Plans are well under way, it is said, for a large output of these two cars for the coming season, some 20,000 of them being on the schedule. This at once gives one good reason why the price can be made so low, for the size of output is one of the biggest price-controlling factors.

The car throughout has been designed for quickness of assembly and simplicity of construction, so as to bring the per car cost reduction to what the Argo concern believes to be very near the minimum.

The specifications include a $2\frac{3}{4}$ by $4\frac{1}{2}$ -in. motor, wheel-base of 96 in., cone clutch, Atwater Kent ignition, left steering, semi-floating rear axle fitted with the Bailey differential, elliptic spring suspension, two-speed gearset and 28 by 3 tires.

Lightness a Leading Feature

In the general makeup of the Argo, lightness of weight has been a paramount consideration, and just how well the designers have succeeded in this is brought out by the fact

that the roadster tips the scale at about 1000 lb., with the touring car weighing only 200 lb. more.

The motor is a conventionally-designed four, with the cylinders cast in block, and with the valves all on the right and inclosed by a plate. The cylinder block is separate from the crankcase to which it bolts in the regular way. The case is of aluminum and of the barrel shape with a large plate at the bottom for getting at the crankshaft bearings. To disassemble the crankshaft a large plate at the rear end of the case admits of its being pulled out through this end.

This construction of the crankcase makes a rigid engine, and the arrangement has been employed on a number of other engines with good results. The motor really develops a very creditable amount of power for its size. On brake test it shows about 17.5 hp. at normal operative speed, whereas the S. A. E. formula rates it at 12.1 hp.

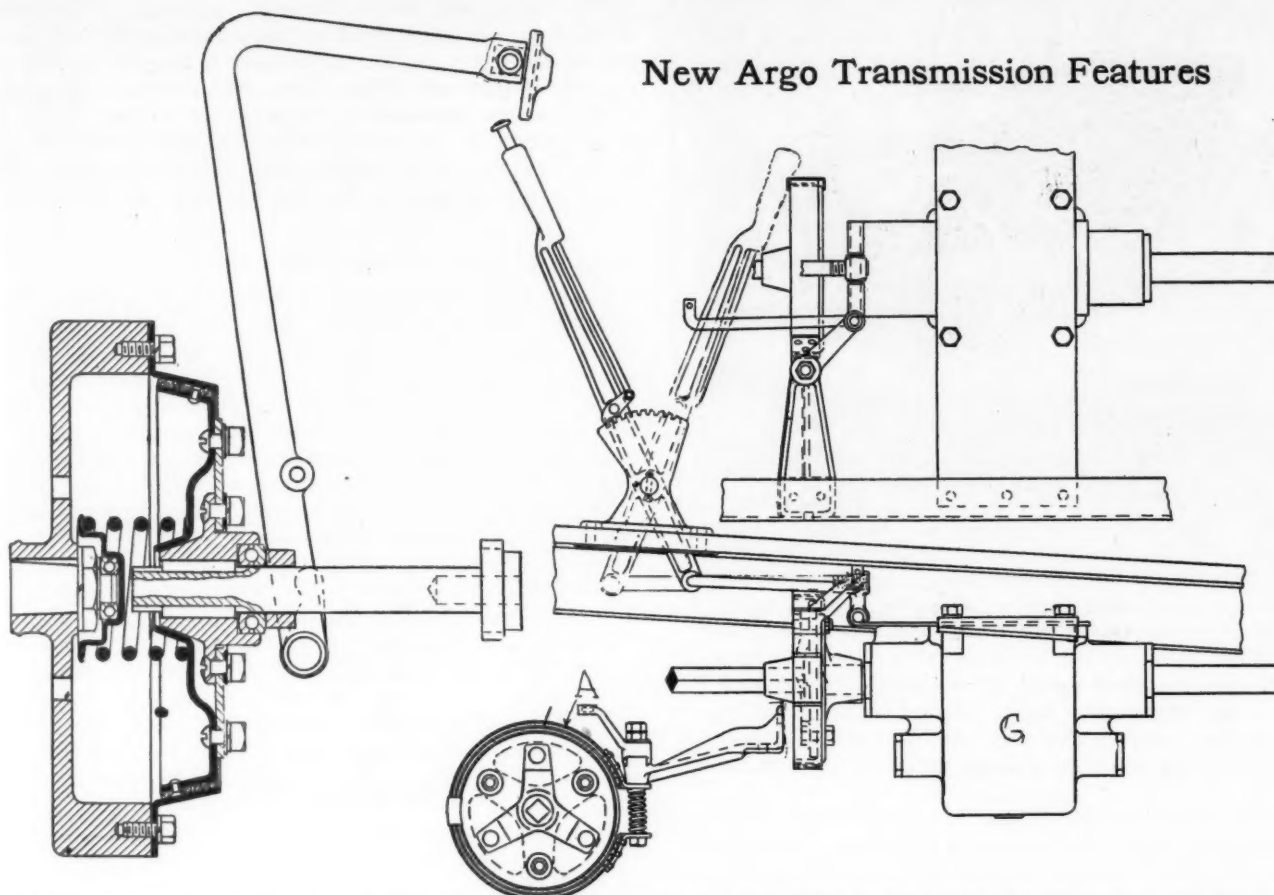
Three-Point Motor Suspension

The suspension of the engine is at three points, due to the resting of the front center on a cross-member and the use of a bar of steel tubing at the rear, this taking the place of the ordinarily-used integral aluminum crankcase arms. Such a means of support makes a strong and light design without taking up a great deal of room.

Standard practice is adhered to throughout the working parts of the engine. The crankcase is a two-bearing type, and from it the camshaft is driven by gear, with the drive for the fan pulley and distributor by another gear in connection with this cam gear. These gears are all very neatly housed, and they are made readily accessible by conveniently-placed plates.

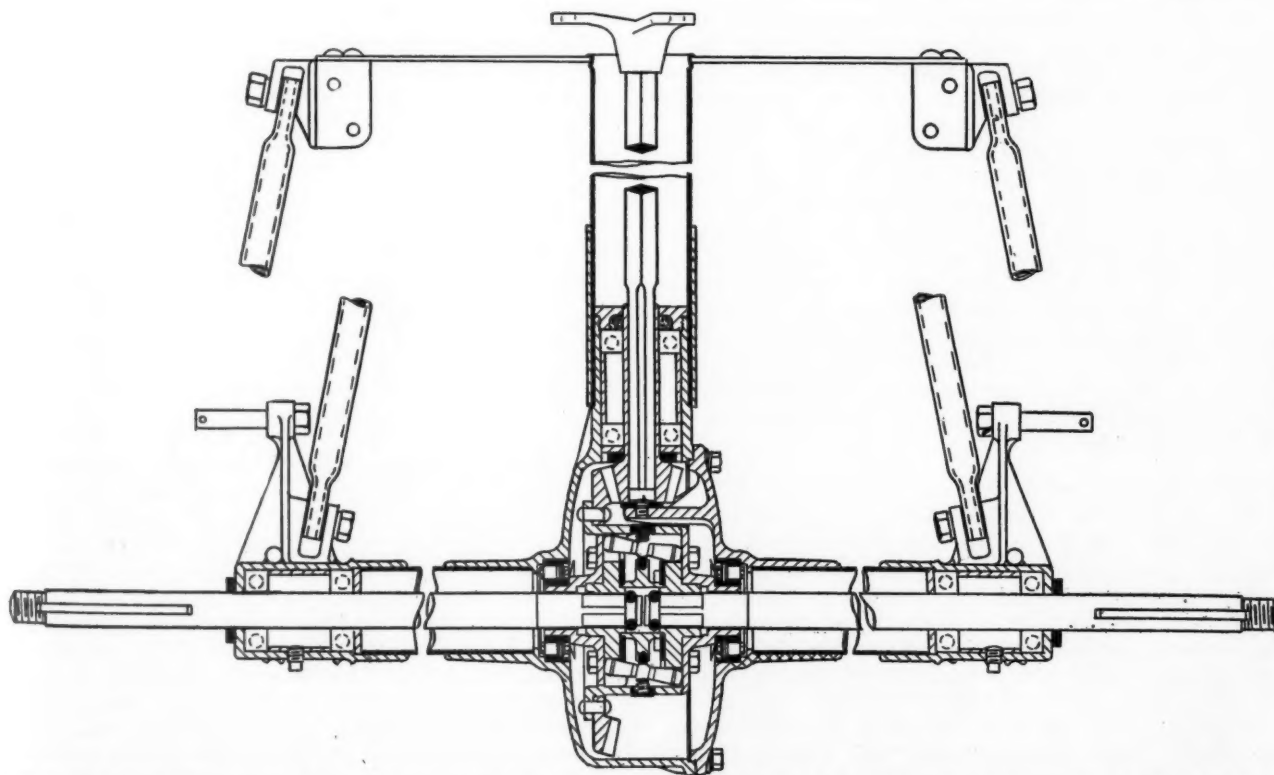
The distributor shaft is on the left and drives the vertically-mounted Atwater Kent instrument by bevel-gear connection. Cooling is effected by thermo-syphon, with large

New Argo Transmission Features

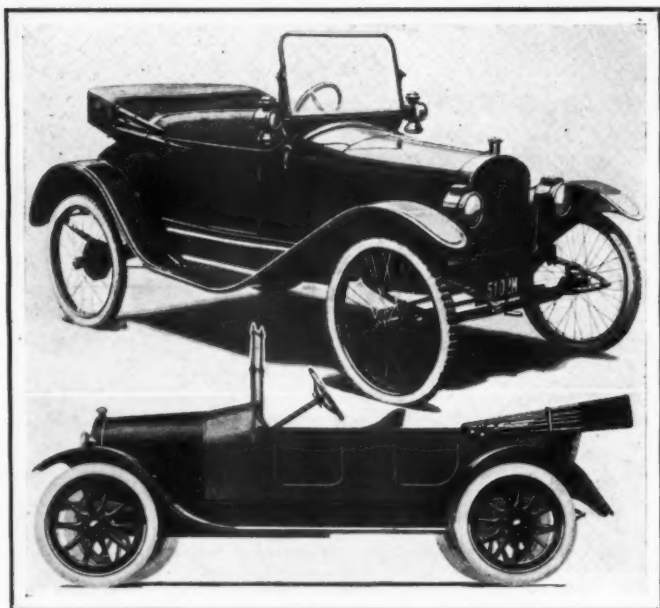


Left—Details of the internal cone clutch. Note that the female member is attached to the flywheel by cap screws. The cone is composition faced and two bearings take the thrust

Right—Mounting of gearbox G and details of combined universal joint and transmission brake A placed between the clutch and the gearbox. As indicated, this brake is operated by the emergency brake lever, giving a very direct and powerful application



Section through Argo rear axle, showing torsion tube enclosing the driveshaft and radius rod provision. The feature of this axle is that it employs the Bailey gearless differential comprising pawls, driving sectors and ratchets to secure a positive drive while at the same time giving the necessary differential action between the two wheels



Above—New Argo roadster selling for \$385. Lower—Five-passenger touring car listing at \$435

water outlet extending practically across the top of the cylinder block. Adjustment for the belt-driven cooling fan is made in the bracket which supports it. This may be swung toward or away from the driving pulley to vary the center distance.

Splash oiling is used. There is a connecting-rod trough under each cylinder, and the oil is thrown by the rod ends. The reservoir which keeps the troughs supplied at a constant level is an integral part of the left side of the crankcase, its location making it very easy to put in the oil—a point which is so often overlooked.

In the chassis design there is a liberal use of chrome-vanadium steel, not only in the driving members, but other parts taking strain. The drive from the engine is taken through an internal cone clutch, the female portion being attached to the flywheel by cap screws. The cone is composition faced, and the thrust is taken by two Gurney bearings.

Back of the clutch there is a universal joint of special construction. It is really a transmission brake and universal all in one. The outer part of the joint takes the form of a drum, and a band is fitted around it. Operation of the emergency brake lever contracts this band, thus braking the car through the drive. The band is supported on a bracket which is attached to the side member of the frame.

Back of this two-fold unit the two-speed gearbox is located. It is hung from a rather wide frame cross-member by four bolts. Back of this the driveshaft is inclosed within a torsion tube, and there are radius rods running back to the ends of the axle tubes.

Bailey Gearless Differential

Instead of using the conventional bevel gear differential in the rear axle, the Bailey gearless type is fitted. This construction makes use of pawls, driving sectors and ratchets to form a positive driving connection between the driveshaft and the axle shafts, at the same time allowing for the necessary differential action between the two wheels. The Bailey differential has been described before, and is more or less familiar to the public. There are two ratchets, one attached to each axle shaft, and these are free of the driving sectors which surround them, and which are both fixed to the bevel ring gear. To make a driving connection between these sectors and the axle ratchets, pawls are used, these engaging teeth in the ratchets and also being directly

in contact with the contact faces of the driving sectors.

This drives both wheels forward positively. When either of the driven ratchets revolves faster than its driving sector, due to turning a corner, the ratchet is shaped to push the end of the pawl out of its tooth, thus allowing the ratchet to have a free movement forward. To drive backwards, the sector moves in the reverse direction and pushes the end of the pawl out of the ratchet tooth, this throwing the opposite end of the pawl down into the tooth of the opposite ratchet.

Brake and Clutch on Same Pedal

The service brake system is very simply worked out by attaching the brake to the same pedal that works the clutch, bringing the brakes into play after the pedal has disengaged the clutch. The equalizer is up forward at the pedal, and rods run outside of the frame back to a unique mounting on the front end of the rear springs. The front hinge of the spring is used therefore as a mounting of the brake rod in addition to its function in the spring. From here a shorter rod goes back to the contracting brake band.

There is a surprising amount of room in the touring body, considering the chassis length. Of pressed steel construction throughout, this body gives room for three in the back seat with sufficient leg length.

In either the touring car or roadster, the front seat is adjustable for height and leg room. It can be moved forward or back 3 in., and the same amount up and down.

For \$60 additional, the cars are fitted with a single-unit Disco electric starting and lighting system. This attaches to the right side of the engine and is connected to the crankshaft just forward of the flywheel by a silent chain.

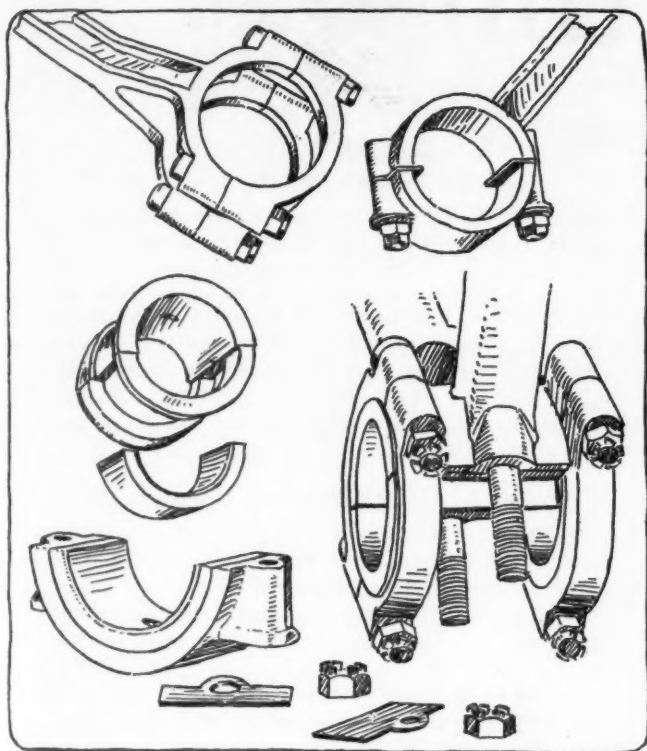
The standard equipment includes top and windshield, top cover, tools, tire pump, horn, gas headlights, and oil side and rear lamps.

Westinghouse Has Two Starting Motors

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will make two types of starter for next season. One has a Bendix type of drive called the automatic screw shift. In this the pinion is drawn into mesh by a quick-pitch thread on the starter shaft, the pinion being connected to the shaft through the medium of a spring. This spring serves to allow the pinion to turn relatively to the armature shaft of the motor so, if the pinion teeth should happen to meet the ends of the flywheel teeth, the spring simply twists a little and lets the pinion slip into mesh with the flywheel gear. The spring at all times makes an elastic cushion between the pinion and the flywheel, so that there is no tendency for the pinion to slip partly out of mesh when coming over each successive compression stage, while cranking a big four.

The other form of motor uses a magnetic shift and the teeth of the pinion and flywheel are in this case cut to a slight angle. They are helical teeth of small inclination. Switching on the current energizes a magnet which draws the pinion along splines on the shaft, against the tension of the release spring. This pulls it into mesh with the flywheel, and the current flowing all the time the starting motor is working is sufficient to keep the magnet energized. As soon as the engine fires the motor speed runs up, of course, and this has the effect of cutting down the current flowing in the starter circuit. Reducing the current causes the magnet to fall off in strength so that the release spring operates and disengages the pinion. This magnetic shift has the advantage that it requires only a small switch. Generators will be made having the ignition unit combined or separate, but the voltage controller and the cut-out are usually mounted in a separate case on the dash. The form of regulation adopted is the vibrator which gives constant voltage direct and not indirectly as in constant current types of generator.

Watson V-Rod Provides Adjustment



Disassembled perspective views of Watson connecting-rod

A CONNECTING-ROD for V motors has been brought out by John W. Watson, president of the American Bronze Co., Berwyn, Pa., which is designed to have the combined advantages of great bearing area and easy adjustability. In other words, this connecting-rod is intended to provide practically the full crankpin bearing area for each of the two rods, and at the same time have the feature of adjustability for any worn part without in any way altering the adjustment of any other part.

Easy Adjustment for Wear

With the Watson type of rod, the repairman can, by dropping the lower half of the crankcase, take up the wear on the crankpin bearings in exactly the same manner as he can with the conventional vertical motor. The cap is removed from the rod and by removing shims, the proper fit is given and the cap then bolted back into place. By the construction of the rod, arrangements are so made that either the forked portion, or that part between the arms of the fork, can be adjusted without disturbing any other part.

The design of this rod is also arranged to minimize wear between the forked rod and the bearing upon which it works. This provision has been made by having the projected area of the forked rod bearing surface about two and a half times that of the projected area of the piston pin bushing, and at the same time inherent motor conditions provide an ample supply of lubricant for this oscillating joint as it is located at the bottom of the rod with the pressure upon the entire bearing equal to that at the wristpin.

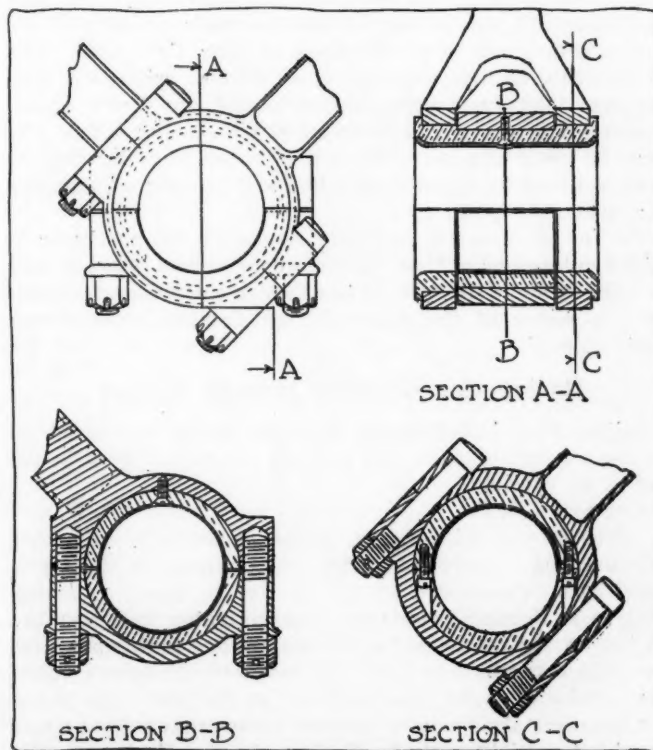
Good Bearing Surface

The rod is designed to replace types which either have good bearing surface and no adjustability, or adjustability without good bearing area. By combining both features it is necessary to make some special provisions of construction,

and it is this feature which is the subject of the patent on the new rod. In laying out the bearing surface of the new rod it is considered that the bearing stresses on the eight- and twelve-cylinder motors are generally less than on other types because the cylinder dimensions are smaller, and in order to obtain advantage of the lower stresses, the construction of this rod provides practically full crankpin bearing area for each cylinder. The bearing bushing is continuous across the entire top of the bearing with the adjustable features on the lower portions. In other words, an explosion in either of two opposite cylinders will work against a bearing which is the full width of the crankpin.

The rod shown in the accompanying illustration was designed for an eight-cylinder motor with cylinders at 90 deg. For a twelve-cylinder motor with the cylinders set at 60 deg., the main rod would incline at an angle of 30 deg. from the vertical instead of at 45 deg. as shown here. The assembly of the rods in the manner in which the adjustments are made are shown very clearly in the accompanying illustration. The shim adjustments can be seen by referring to the constructional and disassembled views. The bearing surfaces of the forked rod when bearing against bronze should be hardened, referring to the oscillating joint. A less expensive and, according to the maker, an equally satisfactory method will be found in leaving the forked rod unhardened and having the back of the bronze shell upon which the rod bears faced with babbitt. Owing to the greater radius of this bearing circle the area of the bearing is such that the babbitt will readily endure the stresses.

The rod was shown to members of the Society of Automobile Engineers, during the recent cruise on the Great Lakes, and attracted attention from those on board who were interested in the design of V-type motors. It is stated that negotiations are under way at the present time with several concerns. The manufacturer states that the cost of the rod will about equal that of present types.



Constructional details of the adjustable V-rod

The Rostrum



Cadillac Eight Geared 4.42 to 1 Direct

EDITOR THE AUTOMOBILE:—Which gear ratio would you recommend for a Cadillac eight? It is desired to make the performance of the car as good as possible considering reduction of wear, avoidance of extreme speed, and as little gear changing as possible. The car is to be driven at an average speed of about 15 to 25 m.p.h. on roads of the kind to be found about New York City within a radius of 100 miles. The car would carry the usual load of five people, two spare tires, tools and kit, and the gear ratios I am considering are 4 to 1, 4.5 to 1, 4.75 to 1 or 5 to 1.

This query is in line with a determination to secure the utmost life of the car in good condition and with its maximum power. At the same time it is desired to have a car which does most of the work on high and which can run at high speed if necessary without the great engine speed which is now necessary.

2—Does the oversize tire 37 by 5 as against 36 by 4½ really return the value in increased wear? What is the effect on the speed and power of the car oversize equipped?

Mt. Vernon, N. Y.

L. M. S.

—The Cadillac eight uses a gear reduction of 4.42 to 1 which is designed to meet just the requirements which you mention. When the engineering department of a concern selects a definite gear ratio, all the requirements which you have mentioned as well as a great many others are carefully considered. Therefore, you need not worry that the gear reduction will not be correct for the roads which you will find within a radius of 100 miles of New York City. The motor of the Cadillac car is designed for high speeds and with the even torque and good balance, should run several thousand miles before any adjustment is needed and before any drop in power is noted. When it is, it can be restored to its normal condition by valve grinding and bearing adjustments the same as any other car.

2—The oversize tire generally returns to the purchaser in added mileage more than the difference in cost between that and the straight size tire. The effect on the power and speed with a motor of the power of the Cadillac eight is unnoticeable.

Racing Car Gasoline Mileage Is Low

EDITOR THE AUTOMOBILE:—Will you kindly advise me as to the number of miles the average racing car goes to the gallon of gasoline?

Greenville, S. C.

E. B. S.

—The number of miles per gallon varies so greatly, that any fixed figure cannot be taken as applicable to all sets of conditions. The reason for this is that in speedway racing such as at Chicago, speeds are so much higher than they are in road racing for instance, that the gasoline consumption for the same cars would be much different were the consumptions measured first on the track and then on the road. The piston displacement also varies to such an extent that a fixed figure could not possibly apply to all sizes of cars. With these circumstances in view, it is impossible to give a broad average

fuel consumption figure for all gasoline cars, because if such a figure were taken based upon all races, it would mean absolutely nothing. In such races, as are held at Indianapolis and Chicago, where the piston displacements are limited to 300 cu. in., the gasoline consumption is somewhere around 6 miles to the gallon.

Holley 1-In. Carbureter on Flanders 20

EDITOR THE AUTOMOBILE:—Can you tell me of a carbureter which will work well on a Flanders model 20. If so, would I have to get a new intake manifold?

2—Would you advise placing a larger carbureter on. If so, what size?

Browns Valley, Ind.

C. S. W.

—The carbureter used on the Flanders 20 is the Holley 1-in. and this gives perfect satisfaction, if it is in good condition, in connection with the special design of manifold used on this model. It is therefore unnecessary to change either the carbureter or manifold.

2—If you put a larger carbureter on your Flanders you would not get any satisfaction at all, for too large a carbureter results in an impossibility of proper adjustment, and hence in very imperfect performance.

Two Sets of Brakes Are Necessary

EDITOR THE AUTOMOBILE:—We would like information concerning brakes for automobiles. As all automobiles are supplied with two sets of brakes, one called the service brake and the other the emergency, both of which act on the hind wheels, why is it necessary to have both? If the service brake will hold the wheels securely from revolving if necessary, surely the additional use of the emergency brake could do no more, and if so, why have both?

Beacon, N. Y.

M. P. B.

—Either brake should be sufficient to lock the wheels and

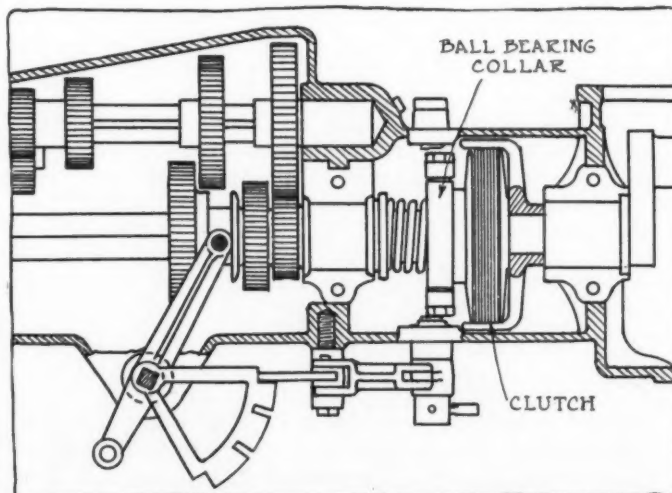


Fig. 1—Layout of 1909 Maxwell gearset and clutch members

hence, as you say the additional use of the emergency brake could do no more. An emergency brake is necessary however, because it is equipped with a ratchet which holds it on when the car is stationary and if the car is stopped on a hill, it is necessary to have such a brake on the car. Furthermore, should the service brake ever be in bad condition, so that it cannot operate, it is a safety precaution to have another brake on the car. The additional use of the emergency brake in stopping is not ordinarily necessary when the service brake is in working condition.

Motor Can Be Repaired at Low Cost

Editor THE AUTOMOBILE:—I have long been an admirer of the American underslung cars and would like to know if that concern sold their business to some other manufacturer as I have heard, and if so, is the American Tourist being manufactured under another name?

It has been said that the engine is of very poor quality. Is this so? What motor was used in the American Tourist 1911? What would be the best motor to put in this model when I desire to change it, considering horsepower, ease of installing, and at the least expense, etc.

Brockton, Mass.

W. BREWSTER.

—The American Motors Co. has been discharged from bankruptcy. Whether or not the stockholders will endeavor to reproduce the car and to get it back into the manufacturing business is impossible to state at this time. The car referred to by you has a Teetor motor and this motor has given uniform satisfaction and is perfectly reliable. Therefore if you desire to put a new motor in, it would be one of the same make. There is no reason why you should place a new motor in the car however, as the one you have can no doubt be repaired for much less than it would cost you to put in a new one, and it would be advisable to take this matter up with the V. A. Longaker Co., 706 Merchants' Bank Bldg., Indianapolis.

Clutch Parts Are Probably Worn

Editor THE AUTOMOBILE:—I have a 1909 model D. A. Maxwell car with a multiple disk clutch that runs in oil and is giving me some trouble. When I engage the clutch it sounds and acts as if it would tear the car all to pieces. I have drained the clutch and washed it out thoroughly with kerosene and supplied new cylinder oil but it does not do any good. Can you tell me what to do.

West Liberty, Iowa.

E. G. W.

—In all probability your trouble is due to the clutch shifter ball cup and cone which has become worn. These two parts form a bearing in the clutch containing twenty-seven $\frac{3}{8}$ -in. steel balls and whenever the ball cup or cone becomes worn a trifle, the ball bearing will tend to make the clutch

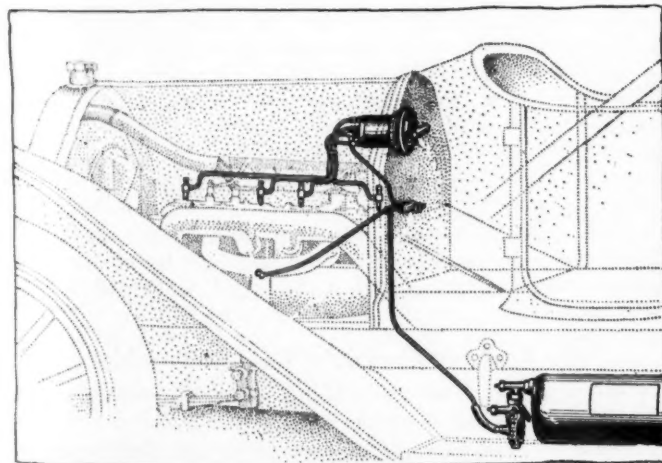


Fig. 2—Diagram showing the installation of the Prest-O-Starter

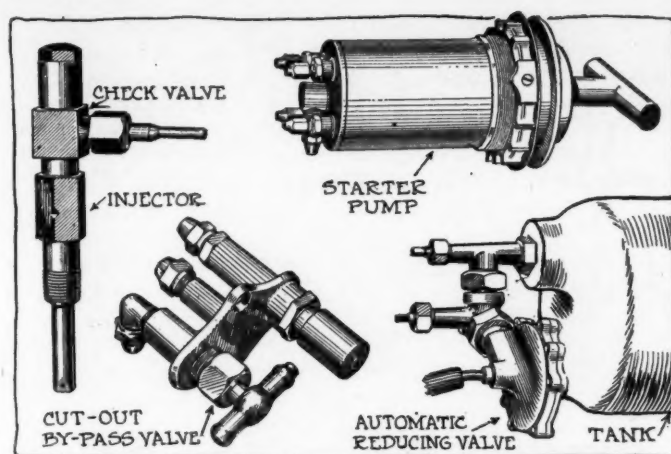


Fig. 3—Parts of the Prest-O-Lite acetylene starting apparatus

itself rattle and slip. It would be well for you to have a competent mechanic to take this clutch apart to see just what parts are worn. A diagram giving an idea of the clutch is shown in Fig. 1.

Rough Contact May Cause Trouble

Editor THE AUTOMOBILE:—Kindly give me information relative to a Ford engine as per the following:

When I short-circuit 1, 2 and 3 vibrating coils in the 1913 model, 4 vibrating coil seems to spark for each cylinder, though irregularly. If I change the position of the units, it makes no difference. I separated the wires, took out the timer and cleaned same. I tested out all the wires separately and found all the connections to be soldered and tight. Also put in a new wire from No. 4 coil to No. 4 on the timer and cannot see a change of any kind.

The vibrator No. 4 seems to work well when the dry cells are used, but when the magneto is used it vibrates about 6 to 10 times a second and causes the engine to miss. The plugs are all good, for I transferred them several times and can note no difference. The No. 4 contact in the timer is rough or wavy. Would that be the cause. A. J. B.

Balston, Pa.

—The symptoms you give for your trouble are rather indefinite, but if the contact in the commutator is rough or wavy, as you state, trouble is sure to develop and it is advisable to replace the commutator case. It would also be well to go over the wiring very carefully and make sure that the coil units in the dash coil are properly adjusted and in good condition.

Speed Depends on Varying Factors

Editor THE AUTOMOBILE:—Can you tell me which company makes the Sandbo starter? It is a hand starter operated from the seat. Can it be attached to a Studebaker model 20? Please give me diagram of same and price.

2—What speed can be gotten out of a Studebaker model 25, 1912 model if the wind resistance is reduced by putting on a racing body?

3—How much more speed can be gotten from a car by putting ether in the gasoline, and how much should be used?

4—How do the compressed air and Prest-O-Lite gas starters work? Can you give me a diagram of the latter?

Sterling City, Cal.

ELMER MARION.

—The Sandbo starter is made by the Modern Specialty Co., Racine, Wis. This starter could probably be adapted to the Studebaker 20. A diagram of the starter as installed on the Ford is given in Fig. 4.

2—We have no records of anyone having made a racing car out of this model Studebaker and hence cannot predict the speed which can be made if this were done. Of course,

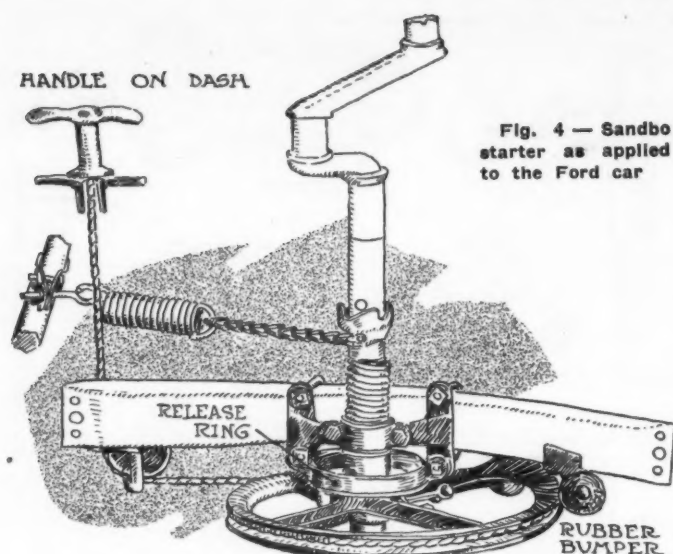


Fig. 4 — Sandbo starter as applied to the Ford car

the speed would depend upon the condition of the motor, the gear ratio provided, the weight, etc., and would vary with each of these factors.

3—THE AUTOMOBILE does not recommend the use of ether added to the fuel.

4—A Prest-O-Lite gas starter operates by injecting a charge of acetylene into the cylinder and then exploding this with a spark which starts the motor. Compressed air starters operate non-explosively by forcing a charge of compressed air into the cylinder in firing position allowing expansion of this air to rotate the motor and cause it to start. A diagram of the Prest-O-Lite gas starter is given in Figs. 2 and 3.

Secret Compounds Used for Float Covering

Editor THE AUTOMOBILE:—Would you please tell me what is used for covering or coating cork floats to keep them from getting gasoline or water logged. I believe that there is something better than shellac as was formerly used. The shellac forms in little blisters or air bubbles over the cork and then it allows the gasoline to get inside which makes them too heavy.

Laconia, N. H.

W. E.

—Some of the carburetor companies are now using a secret compound for covering their cork floats. You can however, make a very satisfactory job with shellac by dipping the float instead of attempting to paint it on. The shellac is thinned with alcohol so that it will lie uniformly over the entire surface.

Wants History of Twelve-Cylinder Motor

Editor THE AUTOMOBILE:—Would you kindly give me a brief outline of the development of the twelve-cylinder motor, stating a few facts in connection with the history of the same?

J. E. S.

New York City.

—The Packard and National twelves are the first commercial automobile engines of this number of cylinders to be built in the world. The National is mentioned along with Packard because its announcement came out at the same time. The twelve must, therefore, be regarded as an untried proposition so far as the stock automobile is concerned.

However, these motors are not the first to be used in automobiles, as, from the best information gathered, the twelve-cylinder Sunbeam racing car was really the pioneer twelve. This Sunbeam, which is an English car, is regarded as one of the fastest cars in existence to-day. This car has made a name for itself on the Brookland's track in England. The cylinders are cast in sets of three, two sets in a row and these two rows at a 60 deg. angle to each one, as in the new

Packard. The cylinders are 3½ by 5½. This Sunbeam has shown it is able to go as fast as its tires will allow and has the one-hour world's record on the Brookland's track, covering 107 miles and 1672 yards. This record will probably stand for some time.

As is known, the Continental concern is about ready with three different sizes of twelve-cylinder motors and the Pathfinder and Davis concerns have already announced twelve-cylinder cars in addition to Packard and National.

The twelve-cylinder motor has been used in aeroplane work for some time, and there are several examples of the V-type as used by Packard and the rest. The most prominent of the aeroplane motors of twelve cylinders are as follows:

Renault	60 deg.	V
Sunbeam-Coatalen	60 deg.	V
Rausenberger	60 deg.	V
Johnson	90 deg.	V (two-cycle)

The last two mentioned are American makes. You can see from the above that the twelve-cylinder motor is really not a new construction, although it is new to motor car use.

The engineers who have adopted the twelve claim great advantages for it, and for more information you are referred to the article which appeared in the May 20 issue of THE AUTOMOBILE on page 888.

Noise Denotes Worn Clutch Parts or Gears

Editor THE AUTOMOBILE:—I have a 1912 Michigan model 33 car on which I would very much appreciate a little information. There is a noise which I think comes from the clutch, but I would like to know what it is exactly before I tear it apart. It sounds very much like the cogs breaking off, or a sort of a ratchet sound when you engage the clutch on low or second gear, no matter how slowly the clutch is left in. It does not do this on high gear; only a sort of grinding sound is heard. When this occurs on first starting out you can feel the vibration coming through the clutch pedal as if it was catching on something. It will also occur when you speed up on low or second gear and pull very hard with the clutch engaged. The engine is in good condition, but the transmission and rear axle are a little worn.

The clutch has had all kinds of lubrication from none at all to heavy oils and hard grease. Can you tell me exactly what oil it should have, and how much? The noise referred to only started to-day, but it is so loud and has so much effect upon the car that I know it must be attended to immediately.

Newport, Pa.

J. F. DAVIS.

—From the information you give, it is not possible to state definitely where the trouble is, but it is very probably due to a worn clutch collar or a stripped or broken gear. Non-fluid oil should make a good lubricant with these bearings.

Rawhide Gear Would Quiet Old Car

Editor THE AUTOMOBILE:—On my 1909 Hispano-Suiza speedster the timing gears have recently and quite suddenly become noisy. The motor is a T-head 10 cm. bore and 12 cm. stroke (4 by 4½). The crankshaft gear and the intermediate are steel, the two camshaft gears are bronze. All of them are intact, but have developed a little play. Would you think it proper to put in a rawhide intermediate gear?

San Juan, P. R.

A. F. W. H.

—You could have a rawhide intermediate gear placed in position between the crankshaft and camshaft gears, and this would no doubt eliminate the noise which is troubling you at present.

Air Leakage Probably Causes Trouble

Editor THE AUTOMOBILE:—What do you think is the trouble with my car judging from the following:

It will run well a couple of miles after starting, but will begin to miss fire on one of the cylinders so soon as the engine gets warm and will miss every time, unless I prime it.

Then it will run well for about one dozen revolutions and start to miss again.

2—Why will not some cars start without first putting gasoline in the priming cups?

3—Which is the best way to stop the engine, that is, so that it will start easily when again wanting to start it?

4—Are the Marathon engines, used in the Marathon cars, made by the Marathon Motor Car Co., Nashville, Tenn.? If not, where?

5—What is the horsepower of the Marathon car according to the S. A. E. rating? It is a four-cylinder, $4\frac{1}{2}$ by $5\frac{1}{4}$.

6—Which clutch is best on a car, the cone or the disk? Carver, Minn. READER.

—Apparently there is an air leak in the cylinder which misses. You should examine this carefully, going over all connections of manifold to the cylinder and also going around the threads of the spark plugs and priming cup. With a rich starting mixture it is possible that an air leak does not have the effect of causing a miss, but as soon as the motor begins to run, expansion due to the heat in the cylinder, causes the leakage to increase and hence a misfire. Another possibility, is that the fuel line is clogged supplying only enough to start and then as soon as the motor is running, the excess is used up and the motor will not have sufficient fuel to run upon. A third possibility is that one of the valves of this cylinder either needs grinding or does not seat properly. This also should be examined and when looking for leaks you should not fail to inspect the bushings surrounding the valve stem.

2—The reason that some cars will not start without first priming, is that a sufficiently rich mixture is not being supplied at the start. This is sometimes due to carbureter adjustment and other times to manifold design, etc.

3—In stopping the motor to secure a rich mixture for starting, the throttle should be opened wide causing the motor to speed up and then the ignition cut off. If you have a dash priming arrangement on your car, if you will operate this on cutting off the ignition, a very rich mixture will be drawn into the cylinders.

4—The Marathon motors are manufactured in the Marathon factory, Nashville, Tenn., where extra motors can be purchased if desired.

5—The S. A. E. rating of the Champion model Marathon, $4\frac{1}{2}$ by $5\frac{1}{4}$ is 32.4 hp.

6—Neither clutch has any claim to superiority over the other as both are used in all grades of cars from the lowest price to the highest.

Testing Cylinders for Roundness and Wear

Editor THE AUTOMOBILE:—If cylinders and pistons are removed from the motor by what method can you determine that the cylinders are so worn that you would need to install new ones or have old ones rebored?

By what method can one determine as to whether or not the piston rings are worn or have lost their resiliency, needing new ones installed?

Dubuque, Iowa.

W. E. C.

—The method which is easiest for determining whether or not cylinders are out of round, is to take a piece of wood or board and cut it so that two of the edges make an exact right angle. The length is made equal to the bore and the flat edge put up against one of the walls of the cylinder, the length being carefully cut off so that the wood will just fit into the cylinder. It is then turned around to different parts of the cylinders and if the clearance at the end varies, the cylinder is not round. A sketch showing this method is given in Fig. 5.

Another way in which the test can be made is by taking strips of brass shim metal of which the thickness is known and placing them at several points around the piston, note if the clearance between the cylinder wall and pistons is equal at all points.

Still another method is to take ordinary inside calipers and calibrate in several directions across the cylinder walls at right angles to the axis of the cylinder. If the width of bore is the same in all directions, the cylinders are round.

To determine whether or not, a cylinder can be properly rebored, it is necessary to know the thickness of the wall and the cost of having oversized pistons made. If the walls are thin, and the oversized pistons not easily procurable, it might be cheaper to buy new cylinders.

To determine the necessity of purchasing new rings, it is only necessary to examine the ring to see if it is worn thin and to spring it into the cylinder to note if the ends of the ring come closely together. The ends should be tight with perhaps clearance enough for the insertion of a sheet of paper between the ends.

Highest Priced Car Not Definitely Known

Editor THE AUTOMOBILE:—Who owns the Jay-Eye-See car and where was it built?

2—Who owns the Simplex Zip and where was it built?

3—Who are considered the best three body builders in America, and where are they located?

4—Are the Rothschild and Kimball bodies made in America, and if so, where?

5—What is the highest priced American automobile made?

6—What is the highest priced European automobile made, and what is the price?

7—Where is the factory of the H. W. Johns-Manville Co., located?

Reading, Pa.

F. A. K.

—J. I. C. was built at the Case factory and according to the records we have at present is the property of Louis Disbrow.

2—The Simplex Zip was built at the Simplex factory and is at present according to what information we have on hand, the property of the Simplex Automobile Co.

3—We have never had any authoritative statements as to who the three best body builders are in this country. This must naturally be a matter of personal opinion.

4—The Kimball body is built by C. T. Kimball & Co., Chicago, Ill. The Rothschild bodies are made in Paris, France.

5—We have no record of what the highest priced car is in this country for the reason that some of the prices quoted are for chassis alone, and it would depend upon what body was put upon the car before the price of the entire car would be known. We have records of chassis such as the Crane selling for \$8,000 for the chassis alone, but whether this is the highest or not we have no definite information.

6—We have no record of this.

7—The Johns-Manville factory is in New York City.

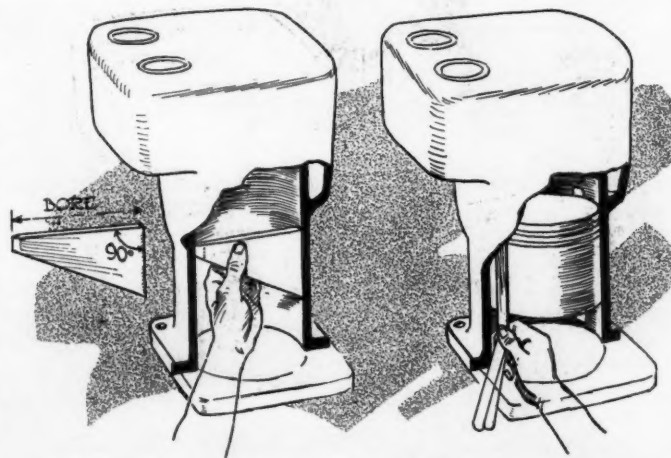


Fig. 5—Method of gaging cylinders by home-made wood gage or by feeler gage or brass shims

Chase Water-Cooled and Worm-Driven

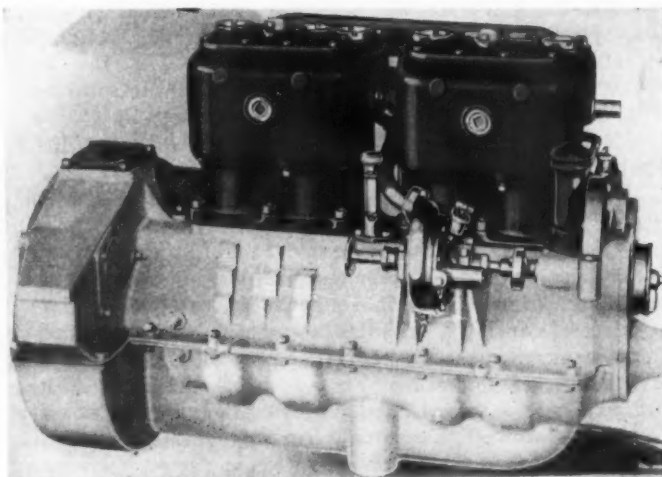
Three Models Ranging from 1500 to 7000 Lb. Designed to Meet Requirements of a Broad Field

A NNOUNCEMENTS of Chase motor trucks have been out for some time and show a complete revision of the line of the Chase Motor Truck Co., Syracuse, N. Y. In place of the air-cooled, chain-driven product a line of worm-driven designs with Continental L-head water-cooled motors has been substituted. All three cars which are being marketed under the names of Models T, R and O are of similar design, although of respectively $\frac{3}{4}$, 2 and $3\frac{1}{2}$ tons capacity. With this line it is thought that the company will supply a truck for any demand whether it is of light, medium or heavy duty between the limits of 1500 and 7000 lb. The prices for the three trucks are respectively \$1,500, \$2,200 and \$3,300.

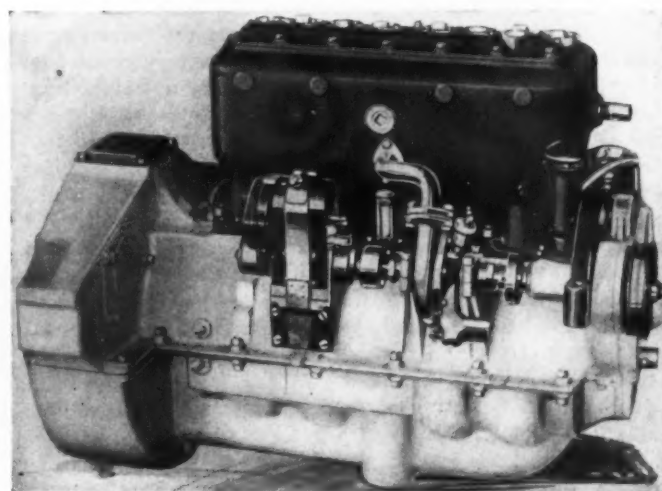
A Well-Balanced Line

From an engineering standpoint, the Chase company has put out a well-balanced line of standardized design which can at the same time fill the requirements of low price and mechanical efficiency. The same make of parts is used in every portion of the vehicle for all three models, although of necessity varying in dimensions for different capacities. At the same time, however, the use of the similar design has allowed the manufacturer to duplicate on many parts where the greatest capacity does not have a direct influence on the dimensions. For instance, the front axles of models R and O are the same and this duplication is carried through in many of the less important parts of the three cars.

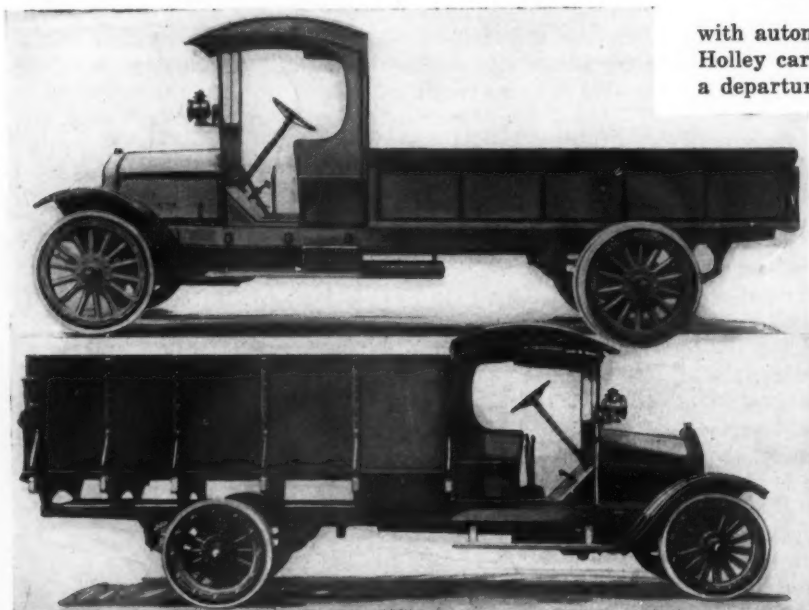
The $\frac{3}{4}$ -ton truck model T has a four-cylinder 3.5 by 5 motor giving an S. A. E. rating of 19.6 hp. Model R 2-ton truck has the same design motor but the dimensions are $4\frac{1}{4}$ by $5\frac{1}{4}$ in. The model O $3\frac{1}{2}$ -ton has a $4\frac{1}{2}$ by $5\frac{1}{2}$ motor. The S. A. E. ratings of the two larger types are 22.5 and 32.4 hp., respectively. All the parts of these motors are of standard Continental design with cast aluminum crankcases and three-point suspension features having the main frame arms at the rear and the trunnion part at the front. They are all fitted



Continental motor used on Chase worm-drive trucks



Block-cast Continental motor for new Chase truck



Two representative styles of bodies supplied with the Chase water-cooled product

with automatic motor governors used in connection with the Holley carbureter. The radiators are the fin and tube type, a departure from standard design being made in the case of model O, which has a cast top bottom and side sections with fin and tube center core.

This radiator is mounted on springs to avoid twisting strains. On the T and R cars the radiators are built-up designs with the fin and tube core mounted on a pressed steel cross-member in front of the motor. The radiator mounting is cushioned to prevent jar.

All models are provided with Bosch high-tension magneto ignition. The gasoline systems are gravity and the tank capacities for T, R and O are, respectively, 16, 23 and 25 gal. The oil tank capacities are 1.75, 2 and 2.5 gal. The motor controls are standard.

Dry Plate Clutch Used

In all three models the multiple disk dry plate clutch is used. These clutches are faced with asbestos and operate against saw steel. The power is transmitted through sliding gear-sets provided with center control, the bearings

in the gearset are Timken rollers and the gearboxes are mounted in a unit case with the motor. This insures a dust-proof connection between the two units. The gearsets are made by the Brown-Lipe Gear Co.

The New Worm Drive

Sheldon rear axles are used and in these are employed the new worm drive which has been adopted throughout this year's model. The worm and gear is a David-Brown type and is shown in the accompanying illustration. The differential mechanism is mounted in the worm gear and the whole assembly is carried on annular bearings with thrust bearings provided on the worm shaft and on the differential. The front axles are a design which is the product of the Chase engineering staff and are I-beam section, drop-forged with spring pads integral. The centers are dropped in a slight curve between the spring pads and high tensile strength gear steel is used for the spindles, which are heat treated and ground to take the wheel bearing.

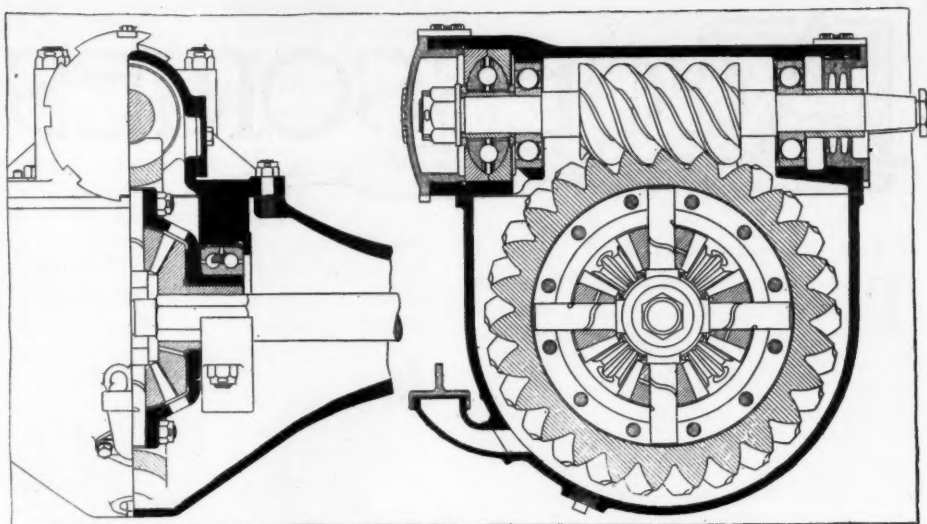
Semi-elliptic springs are used all around on all three models. These are all Sheldon products of alloy steel with the spring eyes bronze bushed. The spring bolts are hardened and ground and have large grease cups. The sizes of the springs vary for each model as follows:

Model	Front	Rear	Model	Front	Rear
T	2 by 36	2 by 48	R	2.5 by 38	2.5 by 52
O	3 by 38	3 by 54	Note:—Dimensions in inches.		

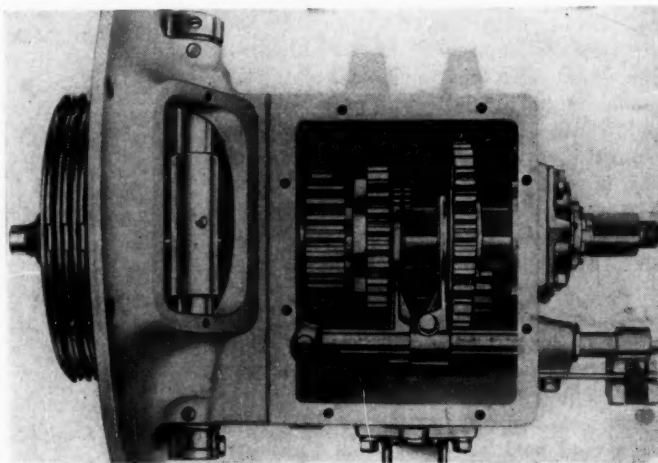
Hydraulic cold-pressed steel frames are employed and these are toed in at the front end to provide a short turning radius. The wheels on the three models are the same in diameter, being 36 in. The tire diameter, however, differs, as would be expected, for the different capacities. On the model T $\frac{3}{4}$ -ton car, they are $2\frac{1}{2}$ -in. front and $3\frac{1}{2}$ -in. rear single. On the model R they are $3\frac{1}{2}$ -in. front and rear with the rear dual. The model O has 5-in. tires front and rear with dual rears. The wheelbases of the three trucks are respectively 135 in., 160 and 146 in.; and 175 and 148 in. The percentage of load on the rear axle as regards the weight of the vehicle itself for the models T, R and O are respectively 53, 59 and 63 per cent. The pay loads on the rear axle are respectively 82, 72 and 83 per cent.

Special Bodies to Order

Special tops and bodies are built to order to suit the requirements of any trade. The bodies are built in the Chase shops

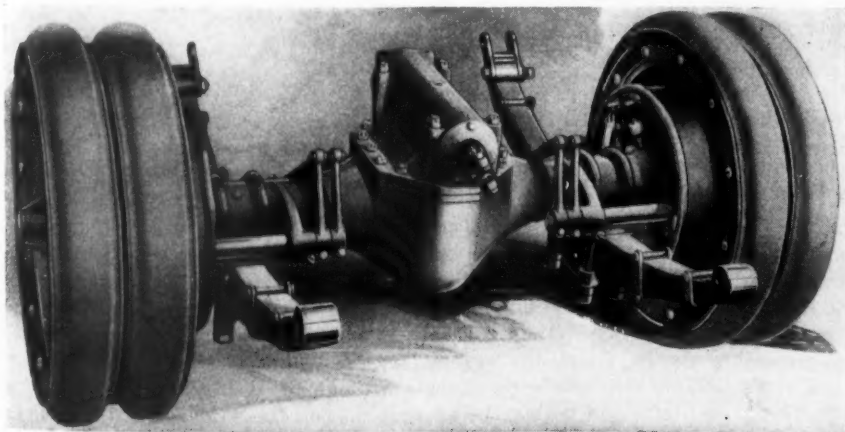


Worm-drive rear axle showing mounting of worm and differential

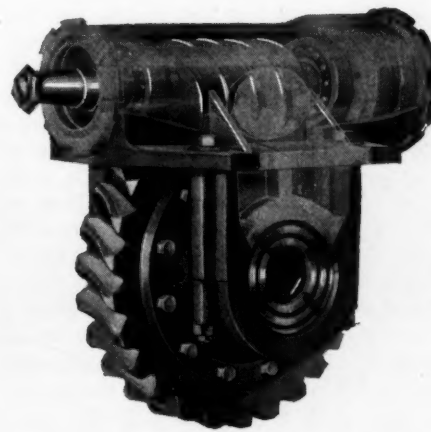


Clutch and gearset used on Chase trucks

and in this manner special requirements of any concern can be met. For standardized work, however, there are standardized bodies some of which are shown in the accompanying illustrations. The cab and fenders are of substantial construction, the cabs having cast aluminum floors. The large models have standard cabs with curved tops, all fitted with windshields. Lamp brackets on these trucks are on the windshield frame. The feature of the largest is a tool box on the frame, on the right side, just back of the seat. These bodies, however, are subject to changes in order to meet the requirements of a given line of work.



Rear axle with dual tires and underslung semi-elliptic springs



Phantom of worm-drive

ACCESSORIES

G. E. Small Battery Rectifier

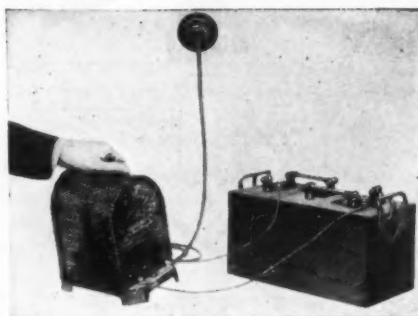
TO fill the wants of those desiring to charge small batteries from the current supplied by the municipal lines, which as a rule have alternating current, the General Electric Co. has brought out a small mercury arc rectifier selling at a price which is comparatively low for these instruments. The exact price of the instrument depends on the current cycles, that for the 60-cycle, 110-volt outfit being \$22.50.

With this equipment the owner of a car fitted with electric lighting and starting is equipped to do his own charging. The rectifier is sold under the model name of S4K and is a compact unit with the coils and vapor tube mounted on a metallic base over which fits a perforated metal cap or casing. The entire 60-cycle unit weighs about 15 lb. and this fact together with the small size, 6½ by 9½ by 11 in., makes it readily portable.

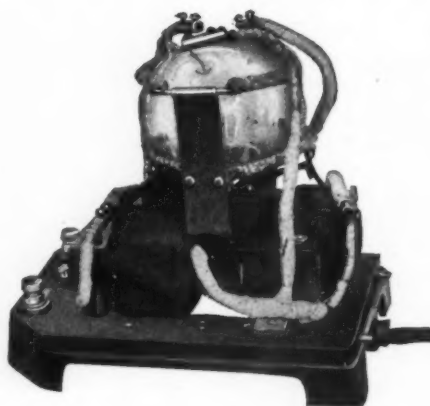
The charging rate from the standard 110-volt supply is about 6 amp. The rectifier is put into operation by screwing a plug into any standard electric light socket and then attaching the negative and positive wires from the rectifier to their corresponding binding posts on the storage battery. The current is then turned on and the rectifier tipped sufficiently to complete the circuit in the mercury tube. After this no attention is required until charging is complete. The cost of charging is said to be about 25 per cent of the ordinary garage charge of 50 cents for a 6-volt battery. —General Electric Co., Schenectady, N. Y.

Presto Electric Lantern

A two-cell hand lantern has been brought out recently, equipped with a 3-volt bulb and a 3-inch bull's-eye lens. It is a complete unit inclosed in a black enamel case 7 inches high, as illustrated. Some of the features of this light are that it can be turned on or off instantaneously and may be used either continuously or intermittently. It is supplied with a revolving head pivoting on the supporting bracket, so that it may be rotated to throw the light in any direction, either straight up or straight down, thereby being useful in such positions as directly beneath a car or for reading or writing. The lamp uses two ordinary 6-volt dry cells of cylindrical shape and is fitted with Edison Mazda bulb with a tungsten filament. The price of the lamp



New G.E. rectifier for charging small batteries from alternating current



The new G.E. rectifier for small battery charging as it appears with the cover removed



Presto electric hand type of lantern using two dry cells and having a 3-volt bulb and a 3-in. bull's eye lens

without batteries is \$1.75.—Metal Specialties Mfg. Co., Chicago, Ill.

Ford Lamps, Brackets and Fenders

A new system for attaching the ordinary oil lamps to the 1915 Ford car consists of the use of a set of three malleable iron brackets, two for the side lamps and one for the tail lamp. They bolt to the projecting flange from the windshield, the side lamp brackets being made up in rights and lefts and taking the ordinary flat lamp bracket prop-holder.

With these brackets any make of lamp can be used, a bolt-on type not being required. The brackets sell for \$1.50 per set of three pieces.

A specially designed bolt-on electric side and tail lamp for Ford cars, having a screw and nut arrangement forming a support and part of the lamps and fitting into the flange bracket projecting from the windshield, has been put on the market by the same company. These lamps are finished in black and brass or black and nickel as desired. Side lamps list at \$4.50 per pair and the tail lamp \$1.20.

The same concern has also brought out a set of bolt-on type round oil lamps consisting of two side lamps and a tail lamp of new Ford type.

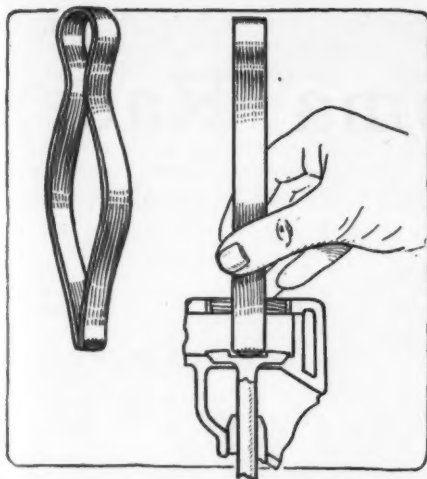
Rear fenders for Ford commercial cars made up in pairs complete with irons may be attached to any kind of delivery body. Fenders have the latest designed curve as in the 1915 Ford touring car fenders and are made of extra heavy steel. Fenders are finished in a triple coat of baked black enamel and are furnished with an inside flash apron. Packed in crates for shipment they sell at \$9.90 per pair.—Superior Lamp Mfg. Co., New York City.

Handy Valve Lifter

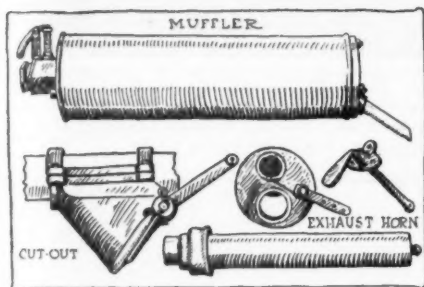
For removing valves after grinding a simple tool has been brought out under the name of the Handy valve lifter. It is in the form of a bent piece of spring steel shaped as in the illustration. When this is inserted in the slot in the top of the valve a pressure on the sides of the instrument expands the knurled tips and secures a grip on the slot of the valve, allowing it to be pulled directly from the cylinder. In some motors it is difficult to remove a valve by merely pushing up on the stem and should a quick push be used the valve will often strike some metal part of the motor or fall to the floor and become dented, thereby damaging its seat. With this tool the work of removing the valve can be quickly done and there is no danger of damaging the valve by allowing it to fall against some hard object. The price of the tool is 75 cents.—Fulton Co., Milwaukee, Wis.

Cutout and Muffler

The Gray cutout is designed to clamp directly to the exhaust pipe in which the proper size of opening has been cut to fit the opening in the cutout, which is turned downward and backward at an angle of 30 degrees to prevent the exhaust from striking the ground and raising dust. It comes in a number of sizes to fit the exact outside diameter of the exhaust pipe, and is made for a tight fit without the use of packing. A torsion spring on the valve holds the outlet door on its seat, and an extra coil spring is



Handy valve lifter for removing valves after grinding. Lifter is illustrated at left and method of operating at right



Top—Gray muffler for Fords with safety valve at front end. Lower left—Gray 30-deg. muffler cutout. Lower right—Gray Autochime exhaust horn

furnished with each cutout to be used when cars have an unusually strong exhaust.

The Gray muffler has outer drums of steel which are asbestos-lined, lock-seamed and riveted, while the heads are packed with asbestos wicking dipped in a special cement to make them gas tight. The front end of the muffler is fitted with a safety valve which remains closed under normal conditions but opens should an explosion occur within, and thus saves the muffler from severe strain. This muffler is now made in a special size to fit the brackets on a Ford car and furnished either with or without a cutout.

The same company manufactures several types of exhaust horn known as the Autochime. This is made to attach to the muffler pipe and exhaust pressure causes it to give out a powerful musical tone. It is furnished with fittings for attachment and an operating pedal.—Gray Hawley Mfg. Co., Detroit, Mich.

Noe Safety Tire Gage

The necessity for proper attention to the tires in order to obtain a maximum service and particularly proper inflation has long been recognized. As a result of this necessity the Noe maximum pressure safety inflating tire gage has been put on the market, the primary object being to provide a device which will

positively prevent underinflation and which will insure the exact air pressure which a pneumatic tire is designed to carry and to automatically indicate at all times the maximum pressure within the tire.

The gage shown in the accompanying illustration, can be attached to any inner tube, inserted through the felloe of a wheel and inflated in the same manner as the present inflating stem, remaining on the inner tube until replacement of the tube is desired, in which case the gage is removed and applied to the new or repaired inner tube. The gage is so hermetically connected to the inner tube that no leak is possible. It is water, tamper and trouble proof.—Seaman P. Noe, Asbury Park, N. J.

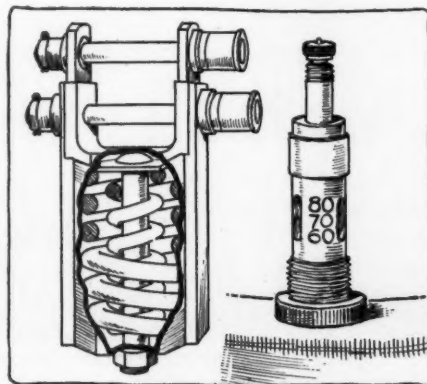
New Era Shock Absorber

This is a simple pattern of coil spring damper having two concentric springs of vanadium steel and an easily accessible adjusting nut, a long bearing is provided on the spring guides and lubrication is taken care of by large grease cups on the spring shackles. No castings are used in the construction, even the outer portion being cold drawn steel. The bushings are arranged so that the absorbers will fit practically any car without any difficulty and each set carries a *permanent* guarantee against defects. Prices vary according to size, the smallest costing \$10 per pair and the largest \$15.—Puritan Machine Co., Detroit, Mich.

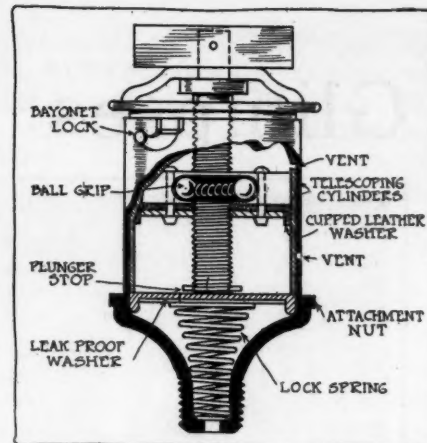
Bailey Grease Cup

An improved grease cup is one of the new C. B. specialties. A few of its features are an improved bayonet lock which cannot jar off and which permits quick filling; operates with thumb and finger only, no pliers or wrenches being needed; the plunger design prevents lubricant passing it; vent holes make ease of operation and prevent grease from returning to the cup; a ball grip prevents the plunger from turning; and the grease is forced into the bearing, a leak-proof washer solving the problem of cleanliness.

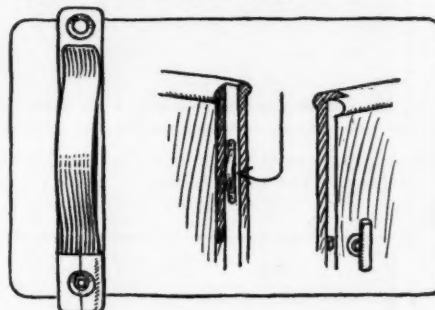
This cup is made in four sizes: $\frac{5}{8}$ -in.,



Left—New Era coil spring shock absorber. Right—Noe safety tire gage



Section through C.B. bayonet lock grease cup which is designed to prevent jarring off and to permit of quick filling



C.B. device for preventing car doors from rattling and to throw them open when unlatched

$\frac{3}{4}$ -in., $\frac{7}{8}$ -in., and 1 in. diameter. Standard $\frac{1}{8}$ -in. and $\frac{1}{4}$ -in. pipe thread, and 5-16-32 S. A. E. are supplied. The cups which are made only in brass, polished or nickel plated, range in price from 30 cents for the $\frac{5}{8}$ -in. polished brass to 45 cents for 1-in. in the same metal and from 35 cents for $\frac{7}{8}$ -in. nickel plated to 50 cents for 1-in. of the same metal.

A device for eliminating rattle on the doors of cars is one of the new C. B. products. This device consists of a strip of high-grade clock spring steel attached in a minute to the door-stop with two small screws and which serves as spring and a dampener of noise when the door of the car is closed. It not only allows easy closing of the doors without noise but also throws open the door when unlatched. The price, including the screws, is 25 cents.

Another anti-rattler made especially for use on Ford and other cars not having wood angle stops is included in the C. B. products. This is of the coil design and is made of high-grade piano wire. A small disk attached to the door strikes the coiled spring when the door is closed the spring in turn acting as a dampener of noise by its reaction on the disk. The spring tension also throws open the door when unlatched. Both anti-rattlers are guaranteed for the life of the car. The price of the latter variety, including the screws, is 20 cents.—Wm. J. Bailey, Newark, N. J.

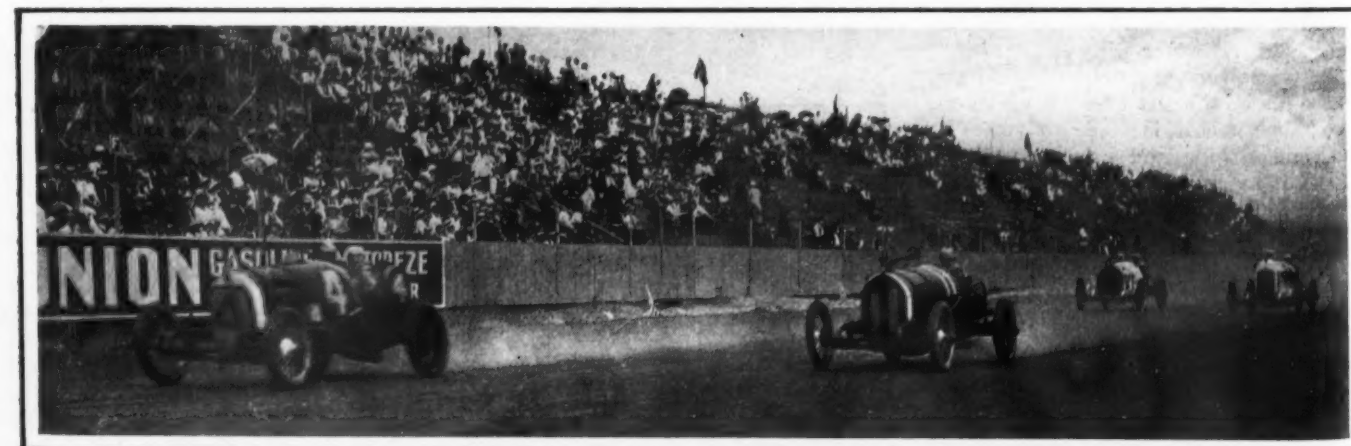
Glimpses of the Tacoma Races



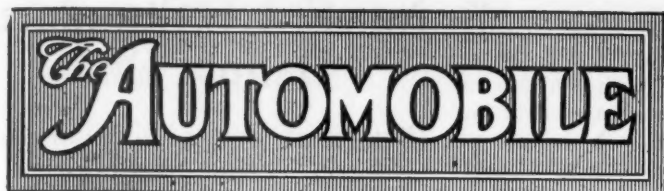
Making ready for the flying start in one of the races held on Tacoma's new 2-mile board speedway over the Fourth of July holidays. The main feature of these races was the greatly increased average speed of the winners over that of former years, due to the new plank surface being more adapted to high speeds and less conducive to skidding than the old dirt surface



Start of the Montamarathon 250-mile race on the Tacoma speedway which was won by Ruckstell in a Mercer in 2 hr. 57 min., or at an average speed of 84.5 m.p.h., which was 11.1 m.p.h. faster than the time made by Coope:, who won this race in the Stutz last year. This year Cooper was second, again in the Stutz, covering the 250 miles in 2 hr. 58 min. 5 sec., or at 84.22 m.p.h.



Pullen leading the field in the 200-mile race for the Golden Potlatch trophy which he won in his Mercer in 2 hr. 21 min. 14 sec., or at an average speed of 85.2 m.p.h., 11 m.p.h. faster than the time made by Hughes' Maxwell in 1914. Cooper in the Stutz was second in this event as well as in the Montamarathon, his average being 85 m.p.h., while Ruckstell was third in the Mercer with 79 m.p.h.



PUBLISHED WEEKLY
Copyright 1915 by The Class Journal Co.

Vol. XXXIII Thursday, July 15, 1915 No. 3

THE CLASS JOURNAL COMPANY

Horace M. Swetland, President
W. I. Ralph, Vice-President A. B. Swetland, Secretary E. M. Corey, Treasurer
T. B. Van Alstyne, Advertising Manager
231-241 West 39th Street, New York City

EDITORIAL

David Beecroft, Directing Editor
Donald McLeod Lay A. Ludlow Clayden
J. Edward Schipper Sydney Oxberry
L. V. Spencer, Special Representative, Detroit

BRANCH OFFICES

Chicago—910 South Michigan Ave., Phone Harrison 7707
Detroit—95 Fort Street, West, Phone Main 1351
Cleveland—516-517 Swetland Bldg., Phone Prospect 167

Cable Address ----- Autoland, New York
Long Distance Telephone ----- 2046 Bryant, New York

SUBSCRIPTION RATES

United States and Mexico ----- One Year, \$3.00
Canada ----- One Year, 5.00
Foreign Countries ----- One Year, 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order, or Register your letter.

Entered at New York, N. Y., as second-class matter.
Member of the Audit Bureau of Circulations.

The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

The Cylinder Question

UP to the present nearly all car makers have aimed at one goal, namely, making cars with the same number of cylinders irrespective of the size of the car and the total piston displacement of the motor. First the four set the pace and all small cars, one by one, dropped the single and two-cylinder design and got into the four-cylinder ranks. Later, when the six established itself, the majority of four-cylinder makers of small cars started changing from fours to sixes, believing that they could not sell the four, no matter how small it was. They contended that the purchaser of the smallest car wanted a six, because that was what the wealthy purchaser had.

To-day we are witnessing a transition from sixes to eights and twelves, and already there are evidences that a few small cars are going to change to more cylinders. This constant change suggests the possible time when makers will not talk so loudly on the number of cylinders but when cars will be sold on performance, and it is really on performance that some of the new cars with more cylinders are being sold. The buyer wants performance, and the sooner he ceases to buy solely on the number of cylinders the better.

What difference should it make to the buyer whether he has four, six, eight, or twelve, providing it gives the best maximum performance, providing it gives desired acceleration, providing it gives

high-speed performances with the greatest ease and absence of vibration, and providing the maintenance of the car is at the lowest mark? These are the important considerations. Two engineers may approach these subjects from different viewpoints, and the only criterion of their success should be the performance of the machine and not the simple question as to whether it has four, six, eight, or twelve cylinders.

More Official Tests

WITH changes in designs of motors and other car parts the importance of official tests such as made by the Packard twelve on the Chicago speedway last week becomes more apparent. Tests of this nature made by A.A.A. officials are the only tests that can be seriously considered by the public. Other tests made solely by the parties concerned invariably have a reverse influence in that the tests are not accepted by rival makers, and the selling forces throughout the country begin a campaign of discrediting the entire affair, and with a certain amount of right to do so. Such conditions are not desired, they should be avoided; we cannot afford to sow the possibilities of deception so broadcast. Let our public have official facts, facts that the rival maker cannot take exception to, facts that are indisputable.

This example of a concern coming out publicly and establishing its standards for speed, economy, etc., should be imitated. It is so immeasurably superior to other methods that comparisons are out of place. It is a business method as compared with publicity tactics, where a would-be standard is attempted out of the performance of some individual in the organization.

Hopeless Instruction Books

THE average instruction book to-day is a treatise for an engineer and not an educational book to be put into the hands of the owner, the chauffeur, the garageman, or the repairman. The books are poorly written, very often not well arranged, and in all cases quite uninteresting. Naturally they fail in their mission, and it is not surprising to find that they are not read or studied as they should be.

Instruction books should be in two parts, one a purely educational one and the other a semi-engineering treatise for the dealer, the expert repairman, and the garageman, who should know the ins and outs of all cars. The latter book would also be well suited to the engineering owner.

The educational book would be a purely educational one on the particular car or model and should not combine two or three models made by the same concern. This should aim at analyzing the entire car for the average reader, in a word, a dissertation on the car, which will result in the owner giving the car rational usage and perhaps directly resulting in the car giving much more mileage than it otherwise would.

Miles Host to N. A. C. C.

Directors and Friends Spend Three Days at His Maine Country Home

CHRISTMAS COVE, ME., July 13—The annual summer session of the National Chamber of Commerce, Inc., is in session here at the summer home of Samuel A. Miles, who in addition to officers and executive committee, is entertaining other leaders in the industry, the entire party aggregating thirty-five. The usual program of fishing, swimming, baseball and other sports is in force, two days being given over to holidaying and one day to the business of the chamber. Mr. Miles has every facility for entertainment at his big estate here with its miles of lake front, its salt water swimming tank, and all of the other essentials.

At to-day's business session of the directors, records of the traffic department of the N. A. C. C. showed that carload shipments of automobiles for June were more than 100 per cent greater than for the same period of last year. The figures are 15,308 carloads as against 7492 carloads for June, 1914.

There was an encouraging report of the desire of almost all the makers to have a uniform time for announcing annual models and some interesting data supplied relative to the progress being made on standardizing automobile treads and on the tendency of legislative bodies to give the jitney bus a fair hearing before passing laws affecting its operation.

Among those entertained by Mr. and Mrs. Miles are: Charles Clifton, C. C. Hanch, Thos. Henderson, Chas. Thaddeus Terry, Carl P. Pelton, J. Walter Drake, Wm. E. Metzger, H. H. Rice, Alfred Reeves, C. M. Hall, Chas. E. Thompson, James H. Foster, H. M. Swetland, F. A. Nickerson, R. D. Garden, Albert L. Pope, Wm. M. Sweet, Thos. J. Wetzell, T. C. Billings and D. J. Post.

Indiana Oxygen Co. Formed

INDIANAPOLIS, IND., July 8—A new firm recently organized here is the Indiana Oxygen Co. Four men form the organization. They are G. D. Armstrong, formerly general superintendent of the Prest-O-Lite Co., L. L. Sinclair of the same company, and W. L. and J. R. Brant. The company produces oxygen and hydrogen by the electrolysis system. A welding department for automobile repairing is a feature of the establishment.

Fisk Running at Full Capacity

CHICOPEE FALLS, MASS., July 9—The Fisk Rubber Co. is running at full

capacity, its daily output being 5000 tires. It is expected that the company will show earnings of \$1,500,000. These profits would contrast with \$782,000 in 1914 and would represent a surplus for the common after paying 7 per cent on the \$5,000,000 of preferred stocks of around 15 per cent. The common is not likely, however, to be placed on a dividend basis as the result of this year's good business. The company has a considerable floating debt and there is need of digesting its rather rapid growth before taking care of the claims of the common stockholders.

Overland's Morrow Plant to Be Enlarged

TOLEDO, O., July 9—The Morrow Mfg. Co., Elmira, N. Y., where Overland parts are made, is to be enlarged immediately by one-third its present size and capacity. The list of more than 2000 employees will be proportionately extended.

By Sept. 1, the Willys-Overland Co. will have an output of 600 cars a day at the local plant. Within less than 1 year the company expects to manufacture and ship 1000 cars every day. The company now has more than 11,000 factory and office employees in this city. A night force of 1500 workmen is laboring to increase the plant's output. The company now is 26,000 cars behind orders received.

Kalb Kelly-Springfield Engineer

SPRINGFIELD, OHIO, June 9—L. P. Kalb has been appointed engineer of the Kelly-Springfield Motor Truck Co., this city. He was formerly connected with the engineering department of the Pierce-Arrow Motor Car Co., Buffalo.

W. C. Guilder has been appointed factory manager in charge of production. He was for several years in the same capacity in the Mack truck factory in Allentown, Pa.

C. F. Gardner has been appointed an assistant to the president, J. L. Geddes.

Sternberg Changes Name to Sterling

MILWAUKEE, WIS., July 10—The Sternberg Motor Truck Co., originally incorporated as the Sternberg Mfg. Co., Milwaukee, Wis., has again changed its corporate title, the new style being Sterling Motor Truck Co. The change is made to conform with the adoption of the name "Sterling" as the trademark on its motor trucks.

Kennedy at Studebaker Plant

DETROIT, MICH., July 8—Henry Kennedy, managing director of the Studebaker Corp., of Australasia, Ltd., Sydney, Australia, has arrived at the Studebaker plant.

New S. A. E. Standard Ballots Out

Reports of Seven Divisions for Vote—Entire Schedule Expected To Be Approved

NEW YORK CITY, July 12—Ballots for the new S. A. E. standards have now been mailed to the members and upon the results of this voting will depend the fate of many new standards, although it is expected that the schedule will go through practically without exception owing to the care with which the standards committee has prepared the reports. The ballots are to be cast before Aug. 16. The reports of the seven divisions which are to be voted upon are those covering carburetor fittings, electrical equipment, electric vehicles, iron and steel, miscellaneous, springs and bell housings. These reports are all printed in the June Bulletin of the S. A. E., and have been digested in THE AUTOMOBILE.

The complete list of details follows:

Sixth Report of Carburetor Fittings Division
Flanges for $\frac{1}{2}$ -in. and $\frac{3}{4}$ -in. carburetors. Flanges for $2\frac{1}{2}$ -in., 3-in. and $3\frac{1}{2}$ -in. carburetors. Carburetor air heater.

Seventh Report of Electrical Equipment Division
Bulb bases, sockets and connector plugs.

Second Report of Electric Vehicle Division
Motor voltage. Motor name-plates. Number of cells in standard battery equipment.

Seventh Report of Iron and Steel Division
Revised vanadium steel specifications. Specification 3330—nickel chromium steel (new). Revised steel castings specification. Elimination of gray iron casting specification. Revised notes and instructions on steels.

Sixth Report of Miscellaneous Division
Flat fan belt and pulley widths. Cotter pin sizes. Brake lining sizes.

Fourth Report of Springs Division
Nomenclature of cantilever springs. Tests for parallelism of eyes and master leaf. Eye bushing and bolt tolerances. Wrapped eyes. Width of spring ends. Frame brackets. Offset of center-bolts. Nuts for spring clips. Center-bolts. Center-bolt nuts. Spring widths.

Report on Bell Housings
Number of bolts. Flange widths. Bolt hole circle.

Jarrard to Handle Apperson Sales

NEW YORK CITY, July 10—T. E. Jarrard, vice-president of the Apperson Bros. Automobile Co., Kokomo, Ind., is in charge of the sales department; assisting him will be J. H. Newmark, who also continues in full charge of the advertising department.

Hutchison Joins Gibson Co.

INDIANAPOLIS, IND., July 18—H. D. Hutchison, who has been in charge of the motor department for the Chicago district of the General Electric Co., has accepted the place of sales manager of the same department of the Gibson company, Overland distributor here.

Record Truck Exports for May

Pass \$10,000,000 Mark—2,426 Trucks Valued at \$6,583,912 Shipped

WASHINGTON, D. C., July 13—*Special Telegram*—The department of Commerce to-day announced that 2426 trucks valued at \$6,583,912 and 4921 passenger cars, valued at \$3,971,483, were exported in May.

This breaks the previous record made in April, 1915, when the \$8,000,000 mark was passed.

During the 11 months ending May, exports were valued at \$46,889,835, divided up into 11,006 trucks at \$30,561,880 and 19,462 passenger cars at \$16,327,955.

Comparing the same month in 1914 the large increase is shown. For the month of May, 1914, there were only ninety-nine trucks, valued at \$127,024 and 3157 passenger cars, valued at \$2,857,601, exported. During the 11 months' period ending May, 1914, the exports were 694 trucks, \$1,061,354, and 26,324 passenger cars, \$23,522,081.

International Standards May Be International Co-operation Division

NEW YORK CITY, July 9—It has been proposed in the council of the Society of Automobile Engineers to change the name of the International Standards Division to International Co-operation Division. If approved by the members of the council, this change will take place immediately.

The reason for making this change is that at the time the International Standards Division was created by the council, a communication was written abroad advising the British Engineering Standards Committee of the creation of the division. At that time the British body inquired as to the activities of the division in view of the use of the word International. After an exchange of communications, it has been found that the original title of the division is misleading from a European point of view, and owing to the possibility of future misunderstandings, and as a result of a conference between Chairman Zimmer-schied of the Standards Committee, Chairman Clayden of the International Standards Division, and Coker Clark-son, general manager of the S. A. E., it has been decided to put the question to a vote by the council.

King to Make No Changes for 1916

DETROIT, MICH., July 12—The King Motor Car Co. has decided not to make any changes, either in construction or in price, in its eight-cylinder car until

the end of this year. This is in accordance with the new policy recently adopted by the company.

During the first six months of 1915 the King company has built and sold about 3500 cars. The first eights were shipped about Jan. 15. It is expected that during the second half of this year the production will total about as many cars as during the first half of the year. Officials say that the business outlook is very good, dealers reporting conditions to be most satisfying in practically all parts of the country.

11,895 Cadillac Eights Shipped First Half of 1915

DETROIT, MICH., July 9—During the first half of 1915 the Cadillac Motor Car Co. manufactured and shipped a total of 11,895 eight-cylinder cars. This is the biggest production for a period of six months in the company's history.

The first Cadillac eights were shipped in October, 1914.

The production records show that 7043 cars were made in April, May and June, as compared with 4852 during the preceding three months. Taking the figures month by month, the output was 1321 in January, 1575 in February, 1956 in March, 2325 in April, 2519 in May and 2199 to June 26.

\$50,000 Additions to Chalmers Plant

DETROIT, MICH., July 12—Two permits for two factory additions to the Chalmers Motor Co. plant were granted last week, involving an expenditure of \$50,000. Factory building No. 4 will be enlarged by second, third and fourth story reinforced concrete additions, while factory building No. 5 will receive a four-story addition.

Barton Top's New Plant

DETROIT, MICH., July 12—The Barton Auto Top Co. will move into its new plant, a one-story structure 65 by 140 ft., during the latter part of July. This plant is located to the rear of the present quarters, which are at 863 Woodward avenue, and which will very likely be maintained as offices.

Gadabout Leases Detroit Plant

DETROIT, MICH., July 12—The Gadabout Motor Corp. of New York has leased a two-story factory building at 182 Lafayette Avenue.

Graham Leaves Bower

DETROIT, MICH., July 13—D. F. Graham, for four years sales manager of the Bower Roller Bearing Co., has severed his connection with that company.

W. S. Bennett, who was assistant sales manager has become sales and advertising manager of the company.

24,000 Reo Cars for 1916 Season

Plans for Factory Additions Extended—New Truck Plant—Loading Dock

LANSING, MICH., July 9—General Manager R. H. Scott of the Reo Motor Car Co. states that the Reo company will build 24,000 passenger cars for next year. Fifteen 2-ton trucks are being shipped daily. Work has been started upon a tract of 4½ acres of ground for the erection of a large new plant for the truck organization.

The additions to the Reo plant announced several weeks ago will be more extensive than originally planned. They will consist of a three-story structure, 101 by 256 ft., with basement, being an addition to the general assembling department; to the final assembly department there will be added an entirely new addition, three stories in height, 115 by 138 ft., with basement, while the present assembly building will receive two additional stories, 80 by 153 ft. A three-story addition, 50 by 74 ft., will be added to the engineering building. Shipping facilities will be greatly relieved through the construction of a loading dock along the Grand Trunk railroad, 347 ft. long and 36 ft. wide.

\$1,000,000 Austin Co. to Make Two-Speed Axles—Seek Plant

GRAND RAPIDS, MICH., July 10—The Austin Automobile Co. will probably be incorporated with a capital stock of \$200,000, while another company is to be organized having a capital stock of \$1,000,000 to manufacture the Austin two-speed axles. A larger plant is also being sought.

Kelly E. A. M. A. President

CLEVELAND, O., July 9—G. H. Kelly, secretary of the Baker R. & L. Co. was elected president of the Electric Automobile Manufacturers' Association at the annual meeting in this city, held recently, to succeed L. E. Burr of the Wood company.

Couzens Joins Pathfinder

INDIANAPOLIS, IND., July 8—St. Clair Couzens, until recently advertising solicitor of the *Chicago Daily Journal*, has joined the Pathfinder company as assistant director of sales and advertising.

Kenworthy Baker-R. & L. District Mgr.

NEW YORK CITY, July 10—C. Y. Kenworthy has been appointed eastern district manager of the Baker-R. & L. Co. Mr. Kenworthy was formerly manager of the Rauch & Lang Co. in this city.

Registrations Break All Records

Iowa Passes 130,000—Close to California's 137,000—New York Over 200,000

DES MOINES, IOWA, July 14—Automobile registrations in Iowa for 1915 have passed the 130,000 mark, thus making a large gain on California, whose registrations up to July 3 numbered 137,383. The amount of fees received from registrations has passed the \$1,000,000 mark.

New York State is still in the lead with a record registration of 200,189 cars. The receipts for the first half of this year for New York were \$1,667,000, against \$1,533,367 for all of 1914.

Iowa's 1914 registrations numbered only 106,087. It is estimated that there will be a total of over 150,000 before the close of 1915. The total receipts last year were only \$1,040,000 and more fees were received in the first six months of this year than during the entire year of 1914.

Iowa farmers contributed \$1,000,000,000 to the general wealth of the Hawkeye State as a result of the bumper crops of 1914. Its wealth per capita, figuring on farm wealth alone, is \$1,682.

Chicago Wheel Tax Must Be Paid by July 20

CHICAGO, ILL., July 12—Beginning July 20 Chicago motorists will have to have their wheel tax paid or be haled into court by the police, as announcement has been made that after that date the Chicago wheel tax ordinance will be enforced. For the last 2 months car owners have not been obliged to pay a wheel tax because the measure was declared unconstitutional. Now that a new law has been passed by the legislature, the old measure will be enforced. However, inasmuch as the law was inoperative during May and June, only ten-twelfths of the annual rate will be collected. For vehicles under 35 hp., the tax will be \$8.34 instead of \$10. This will be good until April 30, 1916. Higher-powered cars will pay a proportionately higher rate.

Du Pont Co. Delivering Cars

NEW YORK CITY, July 12—Under the name of Du Pont Motor Car Co., the Sphinx Motor Car Co., York, Pa., has been re-organized. The factory of the Du Pont company is at York and a factory branch agency has been opened in New York City with the S. S. Shears selling organization. It is stated that the company has French affiliations and will endeavor to do an export business. S. S. Shears, who is vice-president of the

Du Pont Motor Car Co., is in charge of the sales in the East and the company at the present time is disposing of the 1915 model at a price of \$595 preliminary to bringing out a 1916 type which will be announced, it is stated, in about six weeks.

The present car specifications include a Lycoming 3¼ by 5, L-head block motor with Covert gearset, Spicer joints, Weston-Mott axle, Hyatt bearings, Schwartz wheels, demountable rims, Connecticut ignition, Splittorf-Apple lighting and starting, cantilever springs and wheelbase of 112 in., with five-passenger body. Cooling is by thermo-siphon; ignition, Atwater Kent; drive, left; control, center; and the spring suspension, cantilever front and rear. The springs are the product of the Sheldon company. The car is sold fully equipped, the price being f.o.b., York, Pa.

9249 Cars in Louisiana

BATON ROUGE, LA., July 9—Up to July 1, there were 9249 automobiles registered in the State of Louisiana, approximately 9175 of these being gasoline passenger cars; 460 gasoline motor trucks and about seventy-five electric passenger machines. No electric trucks were registered. About \$59,000 in fees was collected by the Secretary of State, no fees nor registration being required for chauffeurs. Approximately 120 registrations are recorded, but there are no non-residents registered.

Michigan Has 99,460 Cars

DETROIT, MICH., July 13—Up to July 10 the Secretary of State of Michigan, has issued 99,460 automobile licenses, which is 23,138 in excess of the total number issued in 1914. It is anticipated that the estimate made early in the year that 120,000 cars will be licensed this year will even be below the actual count by Dec. 31.

Twin Cities in Need of Uniform Laws

ST. PAUL, MINN., July 8—Need of uniform laws governing automobile operation has been emphasized in the Twin Cities by the new dimmer law in St. Paul and the new jitney ordinance in Minneapolis. Motorists and jitneers travel between the cities. In Minneapolis there is no lamp dimmer ordinance, such as has just gone into effect in St. Paul. In St. Paul there is no special law covering jitneys such as went into effect this week in Minneapolis. In the latter city automobiles may pass unloading street cars at a certain distance to the right. In St. Paul automobiles must stop when street cars are unloading passengers. The conflict of the laws causes a great amount of trouble and many arrests of Minneapolis people in St. Paul and St. Paul drivers in Minneapolis.

Ferro 8 Completes 300-Hr. Run

Higher Power at Finish than at Start—Run Practically Non-Stop

CLEVELAND, OHIO, July 8—A 300-hr. run on the test block has just been completed by the Ferro eight-cylinder motor made by the Ferro Foundry & Machine Co. While a few short pauses were made to change the oil and make a few adjustments, it was practically a non-stop run carried out solely for the information of the Ferro engineers and experimental department. An interesting feature is that at the conclusion of the run a higher maximum horsepower was shown than at the start.

The idea was to keep the motor turning over at 1500 r.p.m., at which speed it develops its rated S. A. E. horsepower, and twice during the run the throttle had to be closed a little to keep the speed down to the desired limit.

Commencing with a maximum test which showed 59 hp. the motor was then throttled to 34 hp. and at the finish of the run the maximum was a little over 61 hp. The test was made primarily with the idea that it would show up any weak spots in the motor, and as a matter of fact it did prove that one or two small fittings for which the Ferro company are not responsible were hardly up to standard, and a few replacements of such parts were made. As regards all the essentials of the motor, however, its condition was excellent in every way. For example the exhaust valves, one of which we have had the opportunity of examining, showed no indication of having been in use for more than a few hours, it not being pitted or scored at all. Such stops as took place were of only a few minutes' duration, giving the motor no opportunity for cooling off. Thus the test can be regarded only as satisfactory.

It should be remembered that this is the first long test of an eight of which any details have been made public.

Savannah to Register Automobiles

SAVANNAH, GA., July 8—Unless the State desires the city will not be a party to any appeal from the decision of Judge Charlton of the Supreme Court in the matter of the State automobile tax law and the city's automobile registration ordinance.

Now that the court has held the State law invalid the city's interest in the matter has ceased and it probably will take steps to pass a registration ordinance that is not based upon the State law. City Attorney John Rourke, Jr., will confer with Governor Harris and

Secretary of State Cook to learn what action the State proposes to take.

It had been the city's position all along that it could require the registration of automobiles and Judge Charlton upheld the contention. He declared the State law invalid because the method of apportioning the money to be derived from the special tax was not the proper one, and that the city ordinance was invalid because it was based upon an illegal law.

The probability is that the city will issue numbers and require them to be placed on all automobiles and motorcycles. The machines may be numbered according to the order of their registration. The purpose of Council in passing the ordinance was to provide a check on automobiles and motorcycles for the information of the police department.

Japan Poor Truck Market

AKRON, OHIO, July 8—That Japan is a poor market for motor trucks is indicated in a letter recently received by an American truck maker from the Tokio, Japan, branch of the B. F. Goodrich Co. The letter gives a list of Japanese merchants who have agencies for different makes of trucks.

Ford Buys Seven More Acres of Land

DETROIT, MICH., July 12—Henry Ford purchased seven more acres of land in the River Rouge district, where the new Ford plants will be located. The purchase price of the land was \$20,000, it is said.

\$50 for Accessory Theft

JOLIET, ILL., July 12—The Will county automobile club has offered a reward of \$50 for the arrest and conviction of any person who steals accessories from automobiles.

Illinois Chauffeurs Examined

BLOOMINGTON, ILL., July 12—State examiners are now visiting the principal cities of Illinois, examining all chauffeurs eligible for licensing. A week is being spent in each city. All drivers who are under salary, are required to take the test.

Detroit S. A. E. Fund Increases

DETROIT, MICH., July 9—During June three new concerns have become contributors to the general fund which has been started by the Detroit section of the Society of Automobile Engineers to make it possible to maintain its local quarters. The new contributors are the Paige-Detroit Motor Car Co., which subscribed \$100; the Willard Storage Battery Co. which contributed a similar amount and the Perfection Spring Co. which pledged \$50. The fund totaled \$2,450 July 1.

Breaks Chicago-to-N. Y. Record

E. C. Patterson Covers 1,015 Miles in 35 Hr., 43 Min. with Packard 3-38

NEW YORK CITY, July 13—From Chicago to New York in 35 hr. 43 min. was a record established to-day, when E. C. Patterson, Chicago motoring sportsman, and entrant of the Mercedes in which Ralph De Palma won the Indianapolis 500-mile race this year, finished the 1017.5-mile trip in a Packard 3-38, six-cylinder 4 by 5½, five-passenger touring car. This is elapsed time and shows an average of 28.48 m.p.h. In addition to maintaining this speed Patterson kept his motor running the entire time so that his performance was a non-motor-stop one. He carried with him three other passengers and pilots for the different stages so that the passenger load averaged five all of the time and it was six for short periods.

Delayed by Detours

The party left Chicago at 2.52 Monday morning and reached here 3.35 this Tuesday afternoon. The original schedule was to have brought the car here at 2.03 this afternoon, but there were delays due to detours, a long one at Elyria, Ohio, and another one near Buffalo. There was still further delay by a broken fan belt which had to be replaced at Albany, this being the only mechanical adjustment made during the trip. These delays, coupled with speed regulations entering Greater New York, held the car back. Stops consumed 1 hr. 29 min., leaving actual running time 34 hr. 14 min., which would give a running speed of 29.71 m.p.h.

Only Five Stops for Fuel

One year ago Mr. Patterson made a similar trip but with slower time, 41 hr. 37 min. Since then he has been working on arrangements for the present trip. He carried an additional tank carrying 20 gal. of gasoline in the tonneau and had only to make five stops for fuel on the road. Two speedometers were fitted, one showing 1017 miles and the other 1018. The Blue Book gives the route as 995, the added distance being for detours. Two horns were carried.

Roads Good All the Way

The route followed was through South Bend, Cleveland, Buffalo, Utica, Albany and Poughkeepsie. Roads were good all of the way. Mr. Patterson reports those in Indiana as good, Ohio as splendid, New York as excellent and Pennsylvania as good through Erie, etc. The weather was dry throughout. Night driving took

place between Erie, Pa., and Canandaigua, N. Y.

Accompanying Mr. Patterson were: J. H. Cattell and J. E. Williams, official observers of the Chicago Automobile Club, and W. Gollan. Mr. Patterson drove 60 per cent of the distance. Two rear tires were changed.

Chevrolet Builds New Plant

FLINT, MICH., July 14—The Chevrolet Motor Co. of this city has recently acquired the balance of the capital stock of the Mason Motor Co., which has been furnishing the motors for the Chevrolet cars, and has started the erection of a new one-story motor manufacturing plant. The new building is 616 by 150 ft. and when completed, it is stated, the plant will be capable of an output of 1000 motors a day.

Anderson, Winton Engineer, Killed

CLEVELAND, OHIO, July 13—Harold B. Anderson, chief engineer of the Winton Co., was killed in a street car accident to-day in this city. Mr. Anderson had been with the Winton company since July, 1902. He was born April 1, 1878, and received his technical education in the Case School of Applied Science in this city. After graduation he was consulting engineer of the Van Wagner & Williams Co. for a period of one year, and was for 1½ years with the American Bicycle Co., and the International Motors Co., as mechanical engineer on gasoline car work. He went with the Winton company in July, 1902, being placed in charge of the engineering department not long afterwards. He leaves a widow.

New Dort Distributor in D. C.

WASHINGTON, D. C., July 13—The Miller Brothers Auto and Supply House, this city, has been appointed Dort distributor for the District of Columbia, Maryland and Virginia.

Disco Secures Large Contract

DETROIT, MICH., July 10—The Disco Electric Starter Co., Detroit, has the contract for supplying the Argo Motor Car Co. its starting and lighting systems. The Argo company has contracted for a minimum of 10,000 outfits, and the maximum is expected to exceed 20,000.

Ford J. M. Prices Reduced

NEW YORK CITY, July 10—Starting with the second week in July, all J. M. shock absorber branches all over the country will sell Ford J. M. Shock Absorbers at \$15 per set or \$8 per pair, instead of the previous prices of \$25 per set or \$15 per pair.

Eight New Ford Branches

Number Now Totals Forty-Three—Twenty-Six Assembling Plants

DETROIT, MICH., July 12—Eight new branches will be opened by the Ford Motor Co. Aug. 1. They will be located in Washington, D. C.; Council Bluffs, Iowa; Jacksonville, Fla.; Wichita, Kan.; Fort Worth, Tex.; Nashville, Tenn.; Syracuse and Utica, N. Y.

This will bring the total number of Ford branches in the United States to forty-three and the number of assembling plants to twenty-six. Some of the branches will probably ultimately become assembling plants, but for the present the Ford company does not intend to start new ones.

During the fiscal year ending July 31, the Ford company will have opened four branches and six assembling plants, while work was started on four additional assembling plants and additions started on two others.

Jackson - Church - Wilcox Additions Increase Production 50 Per Cent

SAGINAW, MICH., July 8—Additions to the plant of the Jackson-Church-Wilcox Co., manufacturers of steering gears, will enable this concern, it is claimed, to increase its production 50 per cent. One addition, consisting of a one-story building, 60 by 200 ft., with a saw-tooth roof, will provide more room for manufacturing purposes and for the stock room. The other addition, consisting of a two-story brick and steel open structure, 60 by 48 ft., will be used principally for a hardening department.

At the present time 200 men are employed, two shifts being used in some departments. The company's pay roll averages about \$700 a day, it is claimed. During 1912 the company manufactured 27,000 steering gears; in 1913 the output was 57,000; the total was 67,000 in 1914, and for 1915 it is estimated that by the close of the business year, July 31, the output will show that a total of 100,000 steering gears have been made.

\$600,000 Corp. to Build Tires

NEW YORK CITY, July 10—The Gryphon Rubber & Tire Corp., with a capital of \$600,000, has been formed to manufacture pneumatic automobile tires of a foreign design with a 10,000-mile guarantee. A plant has been taken over in Mount Vernon, N. Y., 65 by 135 ft., and three stories in height, where, in about three months, it is stated, the company will produce 250 tires a day.

S. A. Cunningham, of 2 Wall Street;

P. S. Jones, 5 Nassau Street, and L. Emdin, Deal, N. J., are the incorporators. Jones is the temporary president and Cunningham is treasurer.

The same design of tire has been manufactured extensively throughout Europe, the patentee being Isaac S. McGiehan of London, England. The American patent is No. 1,110,451, filed May 15, 1911. The tire is composed of a fabric carcass or foundation and a tread portion composed of layers of rubber-filled fabric of different widths formed into a crescent band, united thereto by an interposed film of softer rubber, all homogeneously vulcanized.

Firestone Adding Five New Buildings

AKRON, OHIO, July 8—The Firestone Tire & Rubber Co., this city, has placed contracts for the immediate extension of three of the big main wings, plus the doubling of a six-story separate factory building and the erection of a restaurant. This latter building will be three stories and a basement high, and will be about 150 ft. square with a floor space of about 90,000 sq. ft.

These new additions will add 302,000 sq. ft. of floor space to the present plant and will enable the company to nearly double its output.

The original Firestone factory was built in 1902. Here Firestone carriage tires were first made. Thirteen years ago Mr. Firestone and six others constituted the entire office force. To-day over 700 persons are required to handle the office work of the company.

Remy to Add 15,000 Sq. Ft. of Space

INDIANAPOLIS, IND., July 8.—The Remy Electric Co. of Anderson, Ind., will contract for two additional buildings at its local plant that will provide 15,000 more square feet of floor space. It was also definitely announced that the manufacturing departments of the Remy company will remain in Anderson. Recently it was decided to establish an experimental department plant at Detroit. Experimental work will start there soon. It has been definitely decided to do no manufacturing at Detroit. The plant at Anderson at this time is employing 1300 persons and with the additional capacity will employ 150 more.

To Occupy American Voiturette Plant

DETROIT, MICH., July 12—A metal refining company will occupy the plant formerly occupied by the American Voiturette Co. The Detroit Trust Co. sold the property and buildings for \$45,000, which will go to the creditors of the former manufacturer of the Car-Nation and Keeton cars.

Paige Fairfield Six \$100 Lower

Company Will Continue Model for 1916—Increased Production Brings Drop

DETROIT, MICH., July 8—The Paige-Detroit Motor Car Co. will continue for 1916 the Fairfield Six-48 which was placed on the market in January, 1915. The price of this seven-passenger car, the larger of the two Paige sixes, has been reduced to \$1,295, or \$100 less than this year's selling price.

The new price is said to have been made possible by increase in factory capacity and factory production, and the greater perfection of manufacturing methods and merchandising.

Briefly stated some of the principal features in the Fairfield Six-48 are 124-in. wheelbase, Continental L-head block motor, 3½ by 5¼, Bosch magneto, Gray & Davis starting and lighting system, cantilever springs, 34 by 4 tires.

Garage Association for Queens and Nassau Counties

BROOKLYN, N. Y., July 13—The Garage Owners' Association of Queens and Nassau Counties was formed last night at Disbrow Bros. Garage. The action followed the general recognition of certain abuses in the trade. It is planned to meet at an informal luncheon every Monday evening during the early stages of organization. The officers are: President, H. A. Aubinger, Jamaica; secretary, Edward Koster, Jamaica; treasurer, J. T. Callister, Greene County. Membership committee, Paul J. Stock, Owensboro Garage, Flushing; C. W. Smith, Great Neck; R. B. Sterling, Lynbrook; Fred C. Gehrke, Elmhurst; and C. C. Morigl, Ogden Garage, Central Park.

Mennonites Can Buy Cars

SABETHA, KAN., July 10—The prospect is that a few hundred automobiles, possibly reaching about 150 per cent of the families of the community, will be sold here soon. In other words, a community that has never bought automobiles is about to be in the market. The Amish church has modified its rule against automobiles and hundreds of Mennonite farmers are now buying machines.

Recent F. W. D. Changes

CLINTONVILLE, WIS., July 10—J. C. Turk, recently with the International Harvester Co., Philadelphia and New York and formerly in charge of sales for the International Pump Co. in South America and Cuba, has accepted a position of special representative in the

Eastern territory, with headquarters in Milwaukee, for the Four Wheel Drive Auto Co., Clintonville, Wis.

H. C. Gooding, recently in charge of the New York branch of the Corliss Carbon Co., and formerly manager of the Flanders Electric Vehicle Co., Canada, has become identified with the Four Wheel Drive company, as special representative in the middle west with headquarters at Chicago.

F. H. Burdette, recently with the Standard Motor Sales Co., Pittsburgh, Pa., and formerly district manager of the Neyberg company on the Pacific Coast, has joined the sales force of the Four Wheel company. Mr. Burdette will eventually devote his time to the Pacific Coast with headquarters at San Francisco.

Klaxon Wins Horn Suit

NEW YORK CITY, July 10—The Lovell-McConnell Mfg. Co. has won its suit against the Oriental Rubber & Supply Co., a Brooklyn dealer in accessories, Judge Chatfield having rendered an opinion holding the Hutchison patent No. 1,120,057 valid and infringed by electric horns sold by the Oriental concern. The court has issued an interlocutory injunction in favor of Lovell-McConnell and has appointed Joseph G. Cochran master to take an accounting and determine the extent of profits and damages to be paid by the Oriental Co.

The Hutchison patent, which figures in the suit, is one of eighteen new mechanical patents covering details of horn construction taken out by the Lovell-McConnell Mfg. Co., during the past year and covers a new construction having the drive shaft forming the axis of the electric motor at right angles to the plane of the diaphragm and slightly below the center. A face cam is used to vibrate the button at the center of the diaphragm. The suit was in the U. S. district court for the eastern district of New York.

Milwaukee Motor Rejects \$37,500 Offer

MILWAUKEE, WIS., July 8—Creditors of the defunct Milwaukee Motor Co., Milwaukee, Wis., have rejected the offer of E. G. Miller and E. K. John, the principal stockholders, to pay \$37,500 on condition that all claims be released. The First Trust Co., Milwaukee, trustee, filed a petition declaring it has a suit against Mr. Miller to recover \$55,000, alleged to have been paid him out of the corporation's funds while the concern was insolvent, and a suit to recover \$100,000 from Elise John alleged to be due under certain contracts existing between Miller, John and the corporation. The Imperial Automobile Co., Jackson, Mich., also has several suits against the defendants and defunct corporation on account of non-delivery of motors.

1916 Inter-State \$150 Lower

No Changes Made in Car- Reduction on Roadster and Touring Models

MUNCIE, IND., July 9—The Inter-State Motor Co. has made a price reduction of \$150 on its touring and roadster models which for 1915 sold at \$1,000. The new price, \$850, is the only change made for this season, the car being the same mechanically and as regards equipment.

The specifications of the Inter-State car include a four-cylinder Beaver motor with the cylinders cast in a block and with over-head valves. The cylinder dimensions are 3½ by 5 with a 2-in. carbon steel crankshaft carried on three main bearings, the front one having a length of 2¾ in., the center 2 in. and the rear 3¾ in. The motor is oiled by a circulating splash system and is fitted with a 1-in. carbureter. Compactness has been made an object in the layout of the motor, the intake being on the left and the exhaust on the right. The electric starter is on the right, operating through a ring gear on the flywheel with which meshing is secured by a Bendix gear. Cooling is by the thermo-syphon system.

The clutch is a leather-faced cone on an aluminum spider and from it the drive is transmitted through the shaft to the gearbox which is in a unit with the floating axle. The gearset has nickel-steel gears and the drive is taken through a yoke construction. The rear springs are double shackled and the rear axle has a gear reduction of 4 to 1. It is a one-bearing design with 1-in. brakes. To insure a short turning radius a bottle-neck frame is employed.

The dash instruments are carried on a cowl board and the gasoline tank is under the cowl. The equipment includes a one-man top of mohair and full set of instruments and tools. The price, \$850, is f.o.b. Muncie, and applies to either the touring car or the roadster.

Will Make Van Speedometers in Elgin Plant

AURORA, ILL., July 10—Details of arrangement, announced in brief in THE AUTOMOBILE last week, between the Van Sicklen Co., Aurora, and the Elgin National Watch Co., Elgin, whereby the latter will manufacture Van speedometers under the patents held by the former, now can be made public. The watch concern will take over the machinery, tools, equipment, raw material and material in the process of manufacture, owned by the Van Sicklen Co., and will

manufacture the instruments, the Van Sicklen Co. handling the sales.

Some of the advantages gained are a larger production, unlimited facilities and unquestioned financial backing, the entire manufacturing and financial resources of the watch company being back of the Van Sicklen Co. in the production of speedometers and any other specialties it later may determine to market.

C. H. Hulbird, president; Guy V. Dickinson, general sales manager, and George E. Hunter, general superintendent of the Elgin National Watch Co., are stockholders in the Van Sicklen Co. The control, however, is vested in N. H. Van Sicklen, Sr.

The company is capitalized at \$250,000, with all of it paid for in full at par, and there is none for sale. The general offices of the Van Sicklen Co. will be in Elgin after Aug. 1.

No Standard Truck Change

DETROIT, MICH., July 13—The Standard Motor Truck Co. states that no change in its organization has taken place.

Detroit Starter Capital Now \$150,000

DETROIT, MICH., July 9—The Detroit Starter Co. has increased its capital stock from \$20,000 to \$150,000. This concern was started in October, 1914, and its business has been steadily increasing making an increase of capital necessary. At the present time the daily output averages thirty-five starters. This is to be increased to about 125 beginning August 1.

Robbins Co. to Move Plant

INDIANAPOLIS, IND., July 8—The Irvin Robbins Co., designer and manufacturer of automobile bodies, will move its factory to the old plant of the Irvin Manufacturing Co. at Morris and Division Streets. The new home has been thoroughly remodeled and is considered one of the model plants in Indianapolis. It is located on the Belt railroad, offering excellent facilities. In the old location the demand of outside manufacturers was so great that the Indianapolis market was neglected. The new plant was leased with the idea of supplying local automobile companies with bodies. E. Guy Robbins has been continued as president and general manager. W. O. Streller is purchasing agent and production manager. W. S. Eaton has been appointed mechanical engineer and J. A. Dougherty, sales manager.

Ford's Milwaukee Plant Begun

MILWAUKEE, WIS., July 10—The Ford Motor Co., Detroit, Mich., has awarded the general contract for the erection of

its new branch plant in Milwaukee, and work is now under way. It is planned to have the building ready for installation of equipment by November 1, so that operations may start November 15 or December 1. The Bossert contract is stated to be approximately \$250,000. The factory will be located at Prospect Avenue, Kenilworth Place and the Northwestern tracks. A. W. L. Gilpin is Milwaukee manager.

Dividends Declared

Willys-Overland Co., Toledo, Ohio, quarterly 1½ per cent on the common stock, payable Aug. 1 to stockholders of record July 21.

Kelly-Springfield Tire Co., New York City, quarterly 1½ per cent on the common stock payable Aug. 2 to stockholders of record July 15.

Norwalk Stock Order Paid Up

MARTINSBURG, W. VA., July 9—At a meeting of the creditors of the bankrupt Norwalk Motor Car Co., held at the office of Referee in Bankruptcy W. H. Thomas, the referee entered an order directing that the claims for labor, filed against the company by the workmen and others and amounting to approximately \$1,150, be paid out of the assets. It was also ordered that all deferred payments on the stock of the company be collected immediately.

There will be a meeting of the creditors on July 19 at which time the report of Receiver C. G. Smith will be taken up for consideration. At that time it will be decided by Referee Thomas whether the claims filed when Mr. Smith was State receiver can be filed with the bankruptcy claims.

Security Prices Are Normal

Prices Gain on Saturday After Publication of German Reply to Note

NEW YORK CITY, July 12—Security prices at the close on Saturday showed few important changes, the gains or losses hovering between a fraction to 3 points.

The publication of the German reply to President Wilson's note in Saturday's papers had a favorable influence on the initial trading, gains ranging from fractions to 3 points, with most of the buying from the speculative interests.

Automobile and tire issues remained active throughout the week with a few small changes. International preferred went up 3 points, the largest gain for the week. Its common went down ½ point. Chalmers preferred went up 1 point while its common declined 1 point.

Few changes were recorded in the tire issues. Goodrich common dropped 2 points and the preferred rose ½ point. Goodyear common rose 1 point; Kelly-Springfield common rose 2 points, and U. S. Rubber common and preferred rose and dropped ½ point, respectively.

The Detroit issues were a little more active last week, nearly every one of them showing changes. Continental common went up 10 points, the same stock having gone up 5 points.

Stewart-Warner Extra Dividend

NEW YORK CITY, July 10—The Stewart-Warner Speedometer Co., it is

said, will increase the common dividend rate or declare an extra disbursement next fall. The stock has paid 6 per cent per annum since the organization. Profits this year are running well ahead of those of the corresponding period of 1914, and indications are that in the year to December 31 next the company will earn between 12 per cent and 15 per cent on the \$10,000,000 common stock.

Michigan Buggy Plant Sold—Purchaser to Build \$600 Car

KALAMAZOO, MICH., July 6—Part of the plant of the old Michigan Buggy Co. has been purchased by representatives of the States Motor Car Co. of Toledo, Ohio. The consideration is stated to be \$60,000. The States company will manufacture a four-cylinder roadster and touring car, to be known as the Greyhound, and which is to be listed, it is stated, at \$600. Those interested in the Toledo concern are W. D. Smith, Toledo, Ohio; Dr. F. C. Bonine, Niles, Ohio; James H. Johnson, South Haven, Mich. It is claimed that pending the time required to put the local plant into operation a Chicago manufacturing concern will turn out the first lot of the new car.

Ross Heads Eureka Starter Co.

COLUMBUS, OHIO, July 10—The Eureka Mechanical Starter Co., which was incorporated some time ago with a capital of \$30,000 has been organized by the selection of W. A. Ross, president; J. E. Matthews, vice-president and C. E. Bonebrake, secretary. The company holds patents on a mechanical starting device which is said to be out of the ordinary. The device will be manufactured under the contract by other concerns.

Automobile Securities on New York and Detroit Exchanges

	1914		1915		Wk's
	Bid	Asked	Bid	Asked	Ch'ge
Ajax-Grieb Rubber Co. com.	220	..	300	..	..
Ajax-Grieb Rubber Co. pfd.	98	..	101	..	..
Aluminum Castings pfd.	98	100	98	100	..
J. I. Case pfd.	83	92	70	79	..
Chalmers Motor Co. com.	101	103	90	93	-1
Chalmers Motor Co. pfd.	94	95	96	98	+1
Electric Storage Battery Co.	50	52	52½	52½	-¼
Firestone Tire & Rubber Co. com.	300	305	500	506	..
Firestone Tire & Rubber Co. pfd.	108½	110	109	111	..
General Motors Co. com.	91	92½	156	158	..
General Motors Co. pfd.	92	93	101½	102½	+½
B. F. Goodrich Co. com.	26	27	51	53	-2
B. F. Goodrich Co. pfd.	88	90	103½	104	+½
Goodyear Tire & Rubber Co. com.	166	170	270	273	+½
Goodyear Tire & Rubber Co. pfd.	96	97½	106	107	..
Gray & Davis, Inc., pfd.	98	102	..	..	..
International Motor Co. com.	..	3	12½	13½	-½
International Motor Co. pfd.	..	9	35	37	+3
Kelly-Springfield Tire Co. com.	56	58	161	162	+2
Kelly-Springfield Tire Co. 1st pfd.	76	80	85½	87	..
Kelly-Springfield Tire Co. 2d pfd.	94	100	160	170	..
Maxwell Motor Co. com.	14	15	34	36	-1
Maxwell Motor Co. 1st pfd.	44	45	82	84	..
Maxwell Motor Co. 2d pfd.	18	19	30½	32	-¼
Miller Rubber Co. com.	..	..	190	192	..
Miller Rubber Co. pfd.	..	..	103	106	..
New Departure Mfg. Co. com.	125	127	..	..	..
New Departure Mfg. Co. pfd.	105	108	..	..	..
Packard Motor Car Co. com.	103	112	..	112½	..
Packard Motor Car Co. pfd.	97	100	96	100	-½
Peerless Motor Car Co. com.	10	17	67	70	..
Peerless Motor Car Co. pfd.	..	50	94	96	..
Portage Rubber Co. com.	..	30	35	38	..
Portage Rubber Co. pfd.	..	90	92	95	..
*Reo Motor Truck Co.	11½	12½	15½	16	+¼
*Reo Motor Car Co.	18	19	30	31	+¼
Splitdorf Electric Co. pfd.	40	50	..	..	..
Stewart-Warner Speed. Corp. com.	51½	52½	67½	68	-¼
Stewart-Warner Speed. Corp. pfd.	99	101	105	107	+1
Studebaker Corporation com.	30	32	77	79	+1

	1914		1915		Net
	Bid	Asked	Bid	Asked	Ch'ge
Studebaker Corporation pfd.	82	86	99	100	-1
Swinehart Tire & Rubber Co.	85	87	77	78	..
Texas Company	141	143	126	130	-1
U. S. Rubber Co. com.	59½	60½	45	47	+½
U. S. Rubber Co. 1st pfd.	103	104	105½	106½	+½
Vacuum Oil Co.	218	222	193	196	-2
White Co. pfd.	107	110	103	108	..
Willys-Overland Co. com.	88	89	123	124	-3
Willys-Overland Co. pfd.	94½	95	100½	102½	-1½

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS					
Chalmers Motor Co. com.	101	103	..	92½	-2½
Chalmers Motor Co. pfd.	..	95½	94½	98	-1½
Continental Motor Co. com.	..	180	195	..	+10
Continental Motor Co. pfd.	..	75	82	86	..
General Motors Co. com.	91	93	156	158	+2½
General Motors Co. pfd.	92	95	101½	102½	-1
Maxwell Motor Co. com.	14½	15½	34	36	-4½
Maxwell Motor Co. 1st pfd.	44	45	81½	83½	-2½
Maxwell Motor Co. 2d pfd.	17½	19	31	33	-3½
Packard Motor Car Co. com.	103	112	110	115	+2½
Packard Motor Car Co. pfd.	97	100	96½	100	..
*Reo Motor Car Co.	18½	19	29½	30½	-¾
*Reo Motor Truck Co.	11½	12½	15½	16	-½
Studebaker Corporation com.	..	..	77½	79	+1½
Studebaker Corporation pfd.	..	..	98½	100½	..
INACTIVE STOCKS					
*Atlas Drop Forge Co.	19	..	..	26	..
Ford Motor Co. of Canada.	..	555	1275	..	..
Kelsey Wheel Co.	185	..	205	..	..
*W. K. Pruden Co.	..	20½	19½	21½	..
Regal Motor Car Co. pfd.	20	..	..	25	..
BONDS					
General Motors, notes, 6s, 1915.	101	102	..	..	..
Packard Motor Co. 5s, 1916.	95	98½	98½	..	..

*Par value \$10; all others \$100 par value.

Erskine Studebaker
President

Fish Chairman of Board of Directors Who Are Now Divided in Five Groups

NEW YORK CITY, July 8—At a meeting of the directors of the Studebaker Corp., to-day, F. S. Fish was chosen chairman of the board, succeeding J. M. Studebaker. A. R. Erskine, who was vice-president and treasurer, was elected president. C. C. Hanch was chosen treasurer. Mr. Studebaker, the surviving one of the five Studebaker brothers, still stays at the head of the corporation as honorary president, having resigned as chairman of the board of directors.

At a special meeting held yesterday in Jersey City, N. J., the stockholders of the company adopted an amendment to the certificate of incorporation for the classification of directors in groups. The term of office of the board members was arranged afterward in this way: J. M. Studebaker, G. M. Studebaker and J. R. Turner to retire in 1916; E. R. Benson, W. R. Innis and D. M. F. Weeks in 1917; Herbert Lehman, N. J. Riley and A. B. Hepburn in 1918; F. P. Delafield, Philip Lehman and J. G. Heaslet in 1919, and F. S. Fish, A. R. Erskine and Henry Goldman in 1920.

The changes were in line with plans made in 1913 for increasing the corporation's productions and reducing manufacturing costs. At that time Mr. Erskine went over to the Studebaker organization from the Underwood Typewriter Co., of which he had been general manager.

War orders received thus far by the company amount to more than \$20,000,000, the major part of which has been executed. These orders were received from the English, French, Russian, German and Austrian governments and included automobiles and harness.

The company is free from bank debt.

its only obligation being approximately \$3,000,000 of notes and the company has \$7,000,000 in deposit in banks. The earnings on the stock at present are at a rate of considerably more than 20 per cent per annum.

Ross Eight Builder Changes Name

DETROIT, MICH., July 10—The Ross & Young Machine Co. has been succeeded by the Ross Automobile Co., which will continue to build the Ross eight-cylinder car which was announced last January. The new company has been incorporated, its capital stock being \$300,000.

Steel Prices Higher

NEW YORK CITY, July 13—The prices of Bessemer and Open-Hearth steel were higher last week on account of large domestic and foreign orders. Bessemer fluctuated throughout the week, reaching \$20 a ton on Wednesday, dropping the next day to \$19.50, and holding at that price until the close on Monday, a 50-cent rise. Open-Hearth had a gradual rise, closing at \$20.50 per ton, just \$1 higher than Tuesday's price.

The rest of the metals showed a declining tendency. Lead went down 5 cents a 100 lb. and both electrolytic and Lake coppers dropped $\frac{1}{2}$ cent and 1 cent, respectively. Aluminum was steady with a fair demand, holding at 31 cents a pound throughout the week. Both coppers were dull, with domestic consumers remaining out of the market. The exports were light. Tin was dull and lower, quoting at the close at \$38.50, a 28-cent drop for a 100 lb.

Only one change occurred in the oils and lubricants markets, that being a 7-cent drop on refined rapeseed oil, due to a falling off in demand. Cottonseed oil held steady throughout the week, closing at \$6.03 a barrel.

No new features of importance developed in the crude rubber market. Fine Up-river Para held strong at 63 cents.

Daily Market Reports for the Past Week

[illegible]

Texas Crops Increase Orders

Dealers Report Large Sales— Farmers Are Prosperous—Big Cotton Yield Assured

AUSTIN, TEX., July 10—It is stated by automobile dealers of Austin and other cities and towns of the State that the promising crop conditions are reflected in the large increase of orders for cars which were recorded during the thirty days ending June 8, as compared with the previous thirty days. In the wheat districts of north Texas and in the Panhandle the sale of cars is particularly heavy at this time. The wheat and oats crops have been harvested and the bulk of the grain sold at good prices. The farmers are enjoying an unusual degree of prosperity and many of them are investing part of their surplus funds in automobiles. The prosperous condition of the farmers makes business good in the towns and the automobile sales are very satisfactory at this time in the urban communities as well as in the country localities. Another big yield of cotton for Texas is now practically assured. Notwithstanding the decrease of acreage it will not be surprising if the total production of the staple this year is not in excess of 4,000,000 bales. Everything points favorably to unprecedented activity in the various lines of the automobile trade in this State during the late summer and fall months.

Dividend Action on General Motors Stock Expected

NEW YORK CITY, July 8—The directors of the General Motors Co. will meet next month, and it is expected that at this session action will be taken on the matter of dividends on the common stock.

The company's fiscal year ends July 31, and it is estimated that surplus for the common stock will be well over \$50 a share. Earnings on the common in the 1914 fiscal period amounted to 37.6 per cent, and the current fiscal year will be the third successive one in which the company has earned a surplus over 37 per cent on the common. The company has paid no dividends on the common stock as yet.

There is outstanding \$14,895,200 preferred, and \$16,501,783 common stock. It is stated that in addition to the common stock being placed on a cash dividend basis next month a stock dividend also will be declared.

Wilson Body Buys Building

DETROIT, MICH., July 12—The C. R. Wilson Body Co. has purchased a brick building, 25 by 100 ft., located at 494 Clay Avenue.

2½-Mile Speedway for Pittsburgh

Association Formed with \$1,100,000 Capital—Three Sites Under Option

PITTSBURGH, PA., July 12—Pittsburgh is going to have a speedway. The moving spirit therein is J. Numa Jordy, who hails from Florida and is general manager and fiscal agent of the Pittsburgh Speedway Association. The officers of the association, which is going ahead full speed already, are: President, F. J. Kress, who by the way is also president of the F. J. Kress Box Co., a large manufacturing concern, and also of the Pittsburgh Commercial Club; vice-presidents, J. Howard Fry, vice-president of the H. C. Fry Cut Glass Co., Rochester, Pa., and R. D. Ward, general manager of the Ward Baking Co., New York and Pittsburgh; treasurer, Joseph R. Robinson, president of the Braddock Laundry Co. These with Joseph B. Callahan, western Pennsylvania manager of the Security Mutual Life Insurance Co.; Dick Briney, president of the Mutual Laundry Co.; Joseph J. Carr, a well-known real estate man; W. J. Phillips, president of the Phillips & McLaren Co., and Dr. Adolph L. Lewin of the Pennsylvania Savings Bank and the Pittsburgh Central Board of Education, constitute the board of directors.

The Pittsburgh Speedway Assn. has been incorporated under Delaware laws with a capital of \$1,100,000, non-assessable. The first 1000 memberships will be sold at the rate of \$250 each, which gives the holder not only a life membership in the association but twenty-five shares of stock, paid up, and also all privileges of the Speedway association and the Speedway Park Club. Of this sum \$62.50 is to be paid when the application is made and \$187.50 in three equal amounts without interest at two, four and six months. The membership certificates are transferable one year after date on approval of the board of directors. About 410 of these first 1000 memberships have already been sold.

The association has secured for engineers Richard Irvin & Co. and the Hunting-Davis Co., both of Pittsburgh. As director of its amateur contests the board has secured Oscar C. Seikel, athletic director of the Pittsburgh Athletic Association.

The speedway as planned will be 2½ miles long and from 70 to 90 ft. wide with a graduated curve from 3 deg. in the straightaway to 19 deg. at the turns. In the infield, which will contain 160 acres, there will be an eighteen-hole golf course, and tennis courts. The grand-

stand will have a seating capacity of 150,000 people. There will also be a polo field, gun club and bridle path of 56 acres.

The association has three sites under option. All of these are within a radius of 14 miles of Pittsburgh, and any of them will be easily reached by railroad, trolley car and macadam roads. A definite decision as to site will be made before July 20.

The capital of the association is \$1,100,000 in shares of \$10 each. The estimated cost of the speedway ground, park and building is about \$900,000.

Detroit Electric's 2065-Mile Run Costs \$29

DETROIT, MICH., July 9—The Anderson Electric Car Co., has given out figures on the cost of operating its electric brougham during a 26-day test run in June when the car made daily runs averaging 79.4 miles in the vicinity of Detroit. Total cost for the run which aggregated 2065 miles was \$29, made up as follows:

Electric current for battery.....	\$26.56
Flushing battery eight times.....	1.50
Filling grease cups three times.....	.75
Tightening steering tie rod.....	.19
Total	\$29.00

The car used for the test was a model 53, weighing 3962 lb., having a 42-cell 15 W T X lead battery and being fitted with Silvertown cord tires 34 by 4½. The average number of passengers carried on each run was five, the minimum was four and the maximum was six. The average weight of the passengers was 740 lb., the maximum was 900 lb. and the minimum 550 lb. An average speed of 18 miles per hour was maintained during twenty runs, the maximum speed was 22 miles per hour and the minimum speed was 17 miles per hour.

Readville 1-Mile Record Broken

BOSTON, MASS., July 10—In the postponed automobile races held here to-day originally planned for the holiday last Monday, Boston and New York drivers fought out the events with honors even at the finish. There were about 1500 present. A new record for Readville track of 55 4/5 sec. was made by Vail in a Mulford special. Matty Matthews of New York had charge of the races. The summary:

One mile time trials—Won by Vail, Mulford Special, 55 4/5 sec.; Le Cain, Chevrolet, 58 sec., second; Dickinson, Stutz, 59 sec., third.
Ten miles, non-stock—Won by Vail, Mulford Special; Jessup, Chevrolet, second; Jackson, Correo, third. Time 9 min. 50 sec.
Twenty-five miles, non-stock—Won by Le Cain, Chevrolet; Dickinson, Stutz, second; Murchio, Stutz, third. Time 26 min. 22 sec.
Ten miles, handicap—Won by Dickinson, Stutz, 33 sec.; Jessup, Chevrolet, 22 sec., second; Werner, Otto, 2 min., third. Time 12 min., 30 sec.
Australasian pursuit race—Won by Dickinson, Stutz; Le Cain, Chevrolet, second. No time taken.

DePalma to Campaign Stutz Racer

Leases 300-Inch Car—Harry Stutz to Withdraw from Active Racing?

CHICAGO, ILL., July 12—Ralph DePalma has leased the 300-inch Stutz, driven by Howard Wilcox at Indianapolis and has entered the car in the Elgin road races of August 20 and 21. On top of this report comes the rumor that Harry Stutz will withdraw from active racing. Stutz is at present on a fishing trip in the Wisconsin woods, so this cannot be confirmed. Henry Campbell, treasurer of the company, when interviewed, said that the Stutz company had been negotiating with DePalma.

"We are not actually quitting the game. We are endeavoring to campaign them. The cars will belong to DePalma but we will furnish all parts and repairs free of charge and he will retain all prize money. We have the same arrangement with Earl Cooper and hope to close on this basis with DePalma."

When asked if the DePalma arrangement would mark the passing of the Stutz company from actual racing, Campbell evaded the question by saying that the Stutz name would receive the same publicity with DePalma as a team manager as it would under the factory directorship. Campbell refused to make a positive statement on the condition of affairs until Harry Stutz returned to Indianapolis. Stutz has been an ardent supporter of racing since 1911. Cooper has one of the three Stutz cars on the Pacific Coast; DePalma has closed for the other and the third is in Indianapolis.

DePalma has announced that he would campaign the Stutz for the remainder of the 1915 season in addition to the two Mercedes that he has had in his stable for the past year. Last Sunday and Monday he entered the car at the Saginaw, Mich., race meet, where he captured six races on the ½-mile dirt track. He announced that he would drive one of the Mercedes at Elgin and that Caleb Bragg would be at the wheel of the other, but did not name a driver for the Stutz.

DePalma's Stutz First Elgin Entry

CHICAGO, ILL., July 8—The nomination of DePalma's Stutz is the first entry received for the Elgin classics. DePalma will withhold the Mercedes entries until later in the month. E. C. Patterson of Chicago, who has backed the Italian's Mercedes for the past two years, signed the entry blank for the Stutz. It is understood that he and DePalma will stand all the expenses of putting the car in shape for the Kane County events.

Maxwell Withdraws from Racing

No Racing Payroll After August 1—Not Due to Death of Driver Carlson

DETROIT, MICH., July 12—The Maxwell Motor Co., Inc., has withdrawn from speedway racing and is now winding up its racing affairs so that there will be no racing pay roll after Aug. 1. The various Maxwell racing cars have been shipped here where they will be overhauled, but no intimation is made as to their disposal, other than that they will not be raced by the Maxwell company or any of its subsidiaries. It is claimed that this withdrawal of the Maxwell company is not due to the death of Carlson and his mechanic in the recent Omaha meet, but to certain dissatisfaction they claim in connection with Maxwell races.

Another Race on Omaha Speedway

OMAHA, NEB., July 12—The directorate of the Omaha speedway is planning to hold another contest on the 1¼-mile track in October, ten days or two weeks after the inaugural event on the Sheepshead Bay track October 2. The Omaha race will be held during the week of the Ak Sar Ben festival, when the Nebraska metropolis is thronged with visitors. The distance and prize money have not been decided upon as yet. The owners have decided to make two changes in the course. The guard rails will be reinforced by the use of hickory timber and the safety apron at the inside edge of the track will be extended 20 ft. further.

Chicago's 350-Mile Race to Be October 16

CHICAGO, ILL., July 13—*Special Telegram*—At the request of Everard Thompson, manager of the Sheepshead Bay speedway, the management of the Chicago speedway has changed the date of its fall race from Sept. 18 to Oct. 16. Thompson feared that if the Chicago contest was held prior to the opening of Gotham's track, Oct. 2, he might lose some of his entries.

The Chicago race will be the same distance as that in New York, 350 miles instead of 300 miles as formerly agreed upon, in order that the drivers will have an opportunity here to shatter New York records made at Sheepshead Bay.

Chicago Invitation Event Aug. 8

CHICAGO, ILL., July 9—In addition to scheduling a fall race of 300 miles for Oct. 16, the owners of the Chicago

speedway are planning to hold an invitation event on the wooden bowl next month probably Sunday, Aug. 8. The contest will be 100 miles in length, and the following drivers will be asked to enter: Dario Resta, winner of the Vanderbilt Cup, Grand Prize and Chicago race; Ralph DePalma; this year's victor at Indianapolis; Barney Oldfield, and Earl Cooper.

Increase Elgin Prize Money

CHICAGO, ILL., July 13—*Special Telegram*—Promoters of the Elgin road races have decided to increase the prize money for the annual classics, the purse for each of which totals \$3,000. They will take a gambler's chance on the endurance of the cars and each day will give \$100 to each driver completing 100 miles and \$200 to each driver finishing 200 miles, provided the recipient is not eligible to participate in the split of the regular prize money.

\$500,000 Speedway for New Orleans

NEW ORLEANS, LA., July 9—An automobile speedway and equipment to cost about \$500,000 will be constructed in time for a long distance race in February, 1916, the Saturday before Mardi Gras. It was declared that the Mardi Gras race would be made an annual event.

H. C. Moore and S. H. Lindsay of Chicago, are representing the promoters. They have obtained an option on an extensive tract of land in the outskirts of the city.

No Uniontown Hill Climb in 1916

HARRISBURG, PA., July 9—State Highway Commissioner Cunningham has issued notice that no road races or hill climbing contests will be allowed on the state highways. The recent hill climb at Uniontown caused such damage to the road, it is said, that the commissioner asked the attorney-general whether it was within his power to forbid such exhibitions in the future. The attorney-general said that it was.

Duesenbergs for Twin Cities

MINNEAPOLIS, MINN., July 10—Fred Duesenberg of St. Paul, entered the first three cars for the 500-mile race on the Twin-City speedway here Sept. 4. Two of the entries are new sixteen-valve motors, 299 cu. in. cylinder capacity.

Porporato to Drive F-R-P Car

NEW YORK CITY, July 8—Jean Porporato is going to drive an American car, the F-R-P. Mr. Porter will remain general manager of the team and Porporato will hold the title of manager.

Burman Stars at Burlington

Averages 47.06 M.P.H. in First 100-Mile Race on ½-Mile Dirt Track

BURLINGTON, IOWA, July 9—In the first 100-mile race held on a banked ½-mile dirt track under the A. A. A. sanction, Burman, driving his Peugeot, captured first money this afternoon, covering the distance in 2 hr. 7 min., 29.66 sec., averaging 47.06 m.p.h. for the century. At the Kalamazoo 100-mile race last September, Burman made the distance in 1:34:29 2-5, an average of 63.6 m.p.h. O'Donnell's Duesenberg made the distance at Galesburg, June 9, in 1:36 or at 62.5 m.p.h.

The three Duesenbergs, driven by Chandler, O'Donnell and Alley, ran second, third and fourth and annexed \$1,350, the major portion of the \$2,550 prize money. O'Donnell also won three purses of \$100 each for leading at 25½ and 75 miles.

O'Donnell was more than a serious contender at the crack of the starter's pistol; he and Alley jumped to the front and at the completion of 25 miles had a commanding lead over their rivals. O'Donnell kept increasing this advantage and was four laps ahead of Burman when he was forced to stop at his pits after covering 86 miles because of a cracked hub and a broken bearing. This stop lost the race for O'Donnell while he was repairing his car. Burman made up the lost ground and passed him, although he had to make a tire change, while the Duesenberg was at the pits. Burman finished almost 7 min. ahead of Chandler, who captured second place from O'Donnell by the narrow margin of 22 sec. Seconds only separated O'Donnell and Alley, making the race one of the most spectacular held on a dirt track this season.

Three other cars started, Joe Cooper's Sebring; Brown's Du Chesneau and Dall's Buick; the Sebring was put out of commission with a water-flooded carbureter when the car went through a fence and plunged into a pond on its ninety-eighth lap. The Du Chesneau made 199 circuits of the track but did not cross the finishing line. The Buick was distanced. The summary:

Car	Driver	Time
Peugeot.....	Burman	2:07:29.66
Duesenberg.....	Chandler	2:14:14.23
Duesenberg.....	O'Donnell	2:14:36.80
Duesenberg.....	Alley	2:14:51.19

O'Donnell's time for the intermediate distance was as follows:

Distance	Time
25.....	29:10.31
50.....	1:16.91
75.....	1:30:47.18

To Determine Status of Jitney

Indiana Trolley Co. Wants P. S. C. Control—Developments in Other Sections

INDIANAPOLIS, IND., July 13—*Special Telegram*—The Terre Haute, Indianapolis and Eastern Traction Co. to-day filed with the Public Service Commission a long petition asking for an order from the Commission "declaring persons owning, operating, managing and controlling jitney buses to be public utilities and subject to the authority of the Public Service Commission."

The Commission has set July 22 as a date for a hearing on the petition. The scene of the present battle is laid in Terre Haute, although the petition recites that the T. H., I. and E. operates in other cities of the State. That the new method of passenger traffic in the cities is a "substantial and destructive competition of a new type" is admitted by the petition of the Traction company. Senator Al. Zearing at the last session of the Indiana Assembly introduced a bill that sought to put the jitney buses all over the State under the control and regulation of the Public Service Commission. This bill was defeated in the Senate and never reached the House of Representatives for action.

Want New York Jitneys Regulated

NEW YORK CITY, July 14—The first meeting of the Transportation Committee of the Safety First Federation was held yesterday in the Craftsman Building, on Thirty-ninth Street. The speakers were in favor of regulating the jitney by law and holding their owners responsible for accidents. Opinion was divided, however, as to whether the jitneys would be permanent or not.

Baltimore Jitneys to Fight City Ordinance

BALTIMORE, MD., July 10—A unique turn in the plan to regulate jitney buses in this city came to-day. The City Council at a special session passed an ordinance regulating the machines after striking taxicabs and other passenger-carrying motor vehicles, with the exception of the jitney, out of the proposed law. William Curran, a candidate for State's Attorney, who represents a number of the jitney owners, said to-day that if the buses do not follow a regular route they are bound to come under the head of passenger-carrying vehicles and no longer can they be considered under the heading of jitneys.

It is planned that as soon as the law

on jitneys goes into effect, which will be week after next, the jitney people will discontinue to run over regular routes.

It also is planned to take the fight into the courts and have it settled. The jitney men are said to have strong backing and they are determined to fight. They claim they are discriminated against.

The ordinance compels each bus to pay a tax of \$25 per seat per year.

The measure also contains the following provisions:

No person under twenty-one years of age will be permitted to operate jitney, only one person is to ride on the seat with the chauffeur, buses will carry only seating capacity, no one is to ride on the running boards or steps, speed limit of 15 miles an hour and no soliciting permitted, licenses must be obtained from the collector of water rents and licenses and upon these must be stated the time the license is to run and the seating capacity of the vehicle. This license must be posted in the bus. A fine of from \$10 to \$100 is provided for violation of the law. The money taken in by the city is to go to the account for repairing streets.

No Garages in Baltimore Residential Section

BALTIMORE, MD., July 12—No public garages are to be erected in the purely residential sections of Baltimore. This is the stand taken by Mayor Preston and he has already turned down some applicants who wanted to build garages in these sections.

Reo Changes in Los Angeles

LOS ANGELES, CAL., July 9—One of the most important moves of the year in California automobile affairs is the taking over of the California agency for the Reo line by Earle C. Anthony, Inc. The Anthony organization now has the Packard and Chalmers and with the Reo and the state-wide service system which Anthony now maintains, the organization becomes one of the largest automobile agencies in the country.

12 Tons Baltimore Limit

BALTIMORE, MD., July 10—An ordinance prohibiting motor trucks weighing over 12 tons with solid rubber tires to cross any of the bridges in Baltimore has been passed. The measure also provides that to pass over the city streets any truck weighing more than 14 tons, combined weight of vehicle and load, must do so under a special permit issued by the city engineer.

To Regulate Columbus Garages

COLUMBUS, OHIO, July 9—Two ordinances have been introduced in the city council for the regulation of garages and

gasoline filling stations. The ordinances were drawn by the Columbus Chamber of Commerce after an investigation of a special committee.

One ordinance provides that it shall be illegal to construct, maintain or operate a garage located within 187½ ft. of the street on any lot, where three-fourths of the buildings on either side to a distance of 500 ft. are exclusively dwellings, without the consent of two-thirds of the property owners within such frontage of 1000 ft.

The second ordinance is directed against both old and new filling stations and contains about the same provisions as in the ordinance affecting garages.

Southern Pacific Railroad Adopts Master Carbureter

LOS ANGELES, CAL., June 23—The Southern Pacific Co. has adopted the Master carbureter as standard equipment for all its automobile coaches. There are thirty-five of these motor coaches on the Pacific Coast, eighteen out of Sacramento, eight out of Los Angeles, seven out of Portland and two out of Stockton. The cars have six-cylinder power plants with a bore and stroke 10 by 12, each motor using two carbureters.

Jitney Ordinance for Minneapolis

MINNEAPOLIS, MINN., July 10—The Minneapolis City Council has passed a jitney ordinance providing for a \$15 annual license, conditional on the filing of an approved bond for \$10,000 maximum liability. Cars must operate to ends of routes indicated by signs, may carry two more passengers in excess of regular seating capacity, and provision is made for police inspection as to competency of drivers.

Indianapolis Controls Pedestrians

INDIANAPOLIS, IND., July 10—The new traffic rules regulating the parking of automobiles in downtown streets and setting out that pedestrians must obey the signals of traffic policemen in the same manner as vehicles are required to do, went into effect here July 10. Hereafter pedestrians, when crossing streets downtown, will be required to listen for and obey the signals of the traffic officers. Restricted districts have been set aside for parking spaces.

\$500 and Jail for Drink

MILWAUKEE, WIS., July 10—A stringent law relating to the operation of automobiles by intoxicated persons has been passed by the Wisconsin Legislature of 1915 and is now in effect. The statute places a penalty of \$10 to \$200 fine for first offense and a fine of \$50 to \$500 or a jail term of not less than 60 days or both, for second and subsequent offenses.

Factory Miscellany

Western Battery Moves—The Western Storage Battery Co., Chicago, Ill., has moved to Portage, Wis.

To Make Wheel Rests—Eborn Brothers, Orland, Cal., are building a factory to manufacture automobile wheel rests.

Maccar to Build—The Maccar Truck Manufacturing Co., Scranton, Pa., is preparing plans for an addition to its plant for the manufacture of trucks.

Quality Tire to Add—The Quality Tire & Rubber Co. has increased its capital stock and will enlarge its plant at Hartsville, Ohio, in the near future.

Covert to Build—The Covert Motor Vehicle Co., Lockport, N. Y., has let contract for a three-story and basement addition, 46 by 92 ft., to its factory.

Pequannock Rubber Builds—The Pequannock Rubber Co., Butler, N. J., will build a three-story, 47 by 180 ft. and a one-story, 40 by 75 ft. factory to cost \$50,000.

To Make Accessories—The National Service Corp., Hummelstown, Pa., has purchased a canning factory and will convert it into a manufactory for automobile supplies.

To Mfr. Four-Wheel-Drive Truck—N. C. Miller & Son, Dodgeville, Wis., are planning to engage in the manufacture of a new type of four-wheel drive for automobiles and motor trucks.

To Make Truck Bodies—The Hercules Buggy Co., Evansville, Ind., will manufacture a new line of truck bodies and employment will be given to 150 additional men. The men will be put to work in two weeks.

To Make Wheel Builder—The Hinkle Mfg. Co. has been formed in Xenia, Ohio, to manufacture automobile wheel builders. C. R. Hinkle is president. Stock is now being sold and within a short time

the company will take up the active manufacture of the new machine.

To Make Trailers—The Erie Trailer Mfg. Co., Erie, has established a plant at Twelfth and Liberty Streets for the manufacture of trailers to be attached to automobiles. These will be made in different capacities for various hauling purposes. In addition a line will be made for attachment to jitney buses for carrying passengers.

Dunlap Parts Plant For Sale—H. C. Park, receiver for the Dunlap Mfg. Co., Columbus, Ohio, formerly manufacturer of automobile parts, has asked the court for instructions as to the disposal of the plant, located on Parsons Avenue. The property was appraised at \$42,505 and an offer of \$40,000 for the plant and fixtures has been received.

To Make Tops—The Wisconsin Auto Top Co. has been incorporated at Racine, Wis., to succeed to the partnership business conducted by the heirs of the late C. E. McAvoy. The new company has a capital stock of \$15,000 and the incorporators are Alice, Edward and Charles McAvoy. The plant manufactures tops, seat covers and other trimming goods and devices for the motor car trade.

To Occupy S. G. V. Plant—The American Die & Tool Co. will occupy the building formerly known as the S. G. V. plant in Reading, Pa. The main office of the company will remain at its present location, Second and Buttonwood Streets, at which plant it will continue to manufacture axles and miscellaneous bevel-gear work. The new plant will manufacture automobile transmissions and miscellaneous spur-gear work.

To Make Universal Joints—A universal joint for automobiles is one of the new products which the American

Rotary Valve Co., Anderson, Ind., has adopted, and preparations are being made at the plant to turn out about 100 joints a day by Oct. 1 and 200 per day by Dec. 1. W. T. Hensley, formerly with the Westinghouse company of East Pittsburgh, Pa., has joined the company as consulting engineer.

J. I. C. Co. Buys Plant—The plant and business of the Perfection Road Machinery Co., Galion, Ohio, has been purchased by the J. I. Case Threshing Machine Co., Racine, Wis., which has built road construction equipment for several years. The Perfection plant manufactures graders, plows, drags and other machines. No details are available as to the disposition the Case company will make of the Galion plant, but it is presumed these works will not be disturbed and will be operated as a branch of the immense Case organization.

Hupp Clubhouse Opened—The Hupp Motor Car Co., Detroit, Mich., has opened a clubhouse adjacent to its plant for the benefit of its employees. Pending the completion of its new lunchroom in the factory a restaurant will be operated in the clubhouse, which president J. Walter Drake wishes to make a social center. A large lawn next to the clubhouse is being fitted to permit all kinds of games. Office manager F. B. Sides is in charge of the clubhouse, which after it is in running order is to be managed by the employees themselves but with the financial assistance of the Hupp company.

Goodyear Installs Hydraulic Presses—The Goodyear Tire & Rubber Co., Akron, Ohio, has completed the installation of hydraulic presses in its various branches throughout the country, for the purpose of equipping motor trucks with the pressed-on S V truck tire.

The Automobile Calendar

Aug. Milwaukee, Wis., Independent Petroleum Marketers' Assn. of the U. S.; 1915 Convention in Milwaukee.
 Aug. 2-3. San Francisco, Cal., Tri-State Good Roads Assn., Third Annual Convention.
 Aug. 20-21. Elgin, Ill., Road Races.
 Aug. 30. Columbus, O., Show, Ohio State Fair, Columbus Auto. Show Co.
 Sept. Indianapolis, Ind., Fall Show, Indiana State Fair.
 Sept. Peoria, Ill., Second Northwestern Road Congress.
 Sept. 6. Providence, R. I., Speedway Race; F. E. Perkins.
 Sept. 6. Detroit, Mich., Speedway Race; Detroit Speedway Club.
 Sept. 6. Indianapolis, Ind., Show, Indiana State Fair.

Sept. 8-11. Hamline, Minn., 2-Day Meet at State Fair Grounds between Minneapolis and St. Paul, State Fair.
 Sept. 13. Oakland, Cal., Pan-American Road Congress.
 Sept. 17-18. Peoria, Ill., Illinois Garage Owners' Assn. Convention.
 Sept. 20-25. San Francisco, Cal., International Engineering Congress.
 Sept. 18-25. Los Angeles, Cal., Show, Shrine Auditorium.
 Oct. St. Louis, Mo., Show, Forest Park Highlands, St. Louis Automobile Manufacturers and Dealers' Assn.
 Oct. 1. Minneapolis, Minn., Track Race, Twin City Motor Speedway Co.

Oct. 1-2. Trenton, N. J., Track Races; Inter-State Fair.
 Oct. 2. New York City, Sheepshead Bay Motor Speedway Track Meet.
 Oct. 6-16. New York City, Ninth Electrical Exposition and Motor Show at Grand Central Palace.
 Oct. 11-12. Dayton, O., National Paving Brick Manufacturers' Assn., Annual Meeting.
 Oct. 16. Chicago, Ill., 300-Mile Race.
 Nov. 18. Arizona 150-mile Grand Prix.
 Dec. 31. New York City, Show; Grand Central Palace.
 Jan. 22, 1916. Chicago, Ill., Show; Coliseum.
 March 4-11. Boston, Mass., Truck Show, Mechanics Bldg.

The Week in the Industry



Gilson Puritan Sales Assistant—A. Gilson has been appointed as assistant to service sales manager, E. W. Hawley, of the Puritan Machine Co., Detroit.

Mason Heads Indianapolis Garford—The Garford Motor Truck Co., Lima, Ohio, has opened permanent headquarters in Indianapolis. W. R. Mason has been placed in charge of the state distribution. A service station is also maintained.

Frisbie Empire Rep. Now—Joe Frisbie, Indianapolis, Ind., manager of the Empire Tire & Rubber Co., has been promoted to special representative and will assume his new duties at once. J. E. Bright of Chicago, will succeed Frisbie as local manager.

Crawford Resigns from Case—J. F. Crawford, master mechanic of the automobile department of the J. I. Case Threshing Machine Co., Racine, Wis., in charge of design, has resigned to become associated with the Curtiss Aeroplane Co., Hammondsport, N. Y., as chief motor designer.

Garage

New Kansas City Garage—C. B. Traves has opened a new garage at 3320-22 South Main Street, Kansas City.

Genemotor in Baltimore—E. I. Rosenfeld & Co., Inc., 8 South Howard Street, Baltimore, have become the local distributors of the Genemotor, the starter for the Ford cars.

Havana Garage Completed—The new garage building of Coppel & Harsman in Havana, Ill., is completed and the firm moved in this week. Franklin Harsman, formerly in business alone, has taken Lloyd Coppel into partnership, commencing with July 1. This firm has the agency for the Ford and Overland cars and handles a large amount of repair work from Mason county.

Louisville's New Retail Supply House—The Highland Auto Supply Co. will open a wholesale and retail automobile supply house at 813 South Third Street, Louisville, Ky. Salesmen will travel five states. The company also will handle the local wholesale business of the Highland Body Mfg. Co. of Cincinnati, Ohio, which formerly maintained a branch at 728 South Fourth Street. The company is the distributor for Rex plugs, Manzell motor-driven pumps; State agent for Wheeler & Schebler carbureter, and will feature a large line of babbitt repair parts.

Motor Men in New Roles

Levi Goes to Atlanta—J. E. Levi, late with the Premier Motor Manufacturing Co., has been appointed Dixie factory representative for the King eight, with headquarters at Atlanta.

Knapp Makes Texas Change—Wm. Knapp, formerly manager of the Hudson-Davis Co., Mesquite, Tex., has succeeded R. M. Ellis as manager of the Hudson-Davis agency in Arlington, Tex.

Howard Now a Dealer—C. E. Christian has sold the Hupmobile Agency at Kansas City to W. C. Howard. Mr. Howard was formerly assistant sales manager of the Hupmobile factories.

Gaugh Heads Dayton Tire Branch—A distributing plant for the Dayton Tire Co. has been established at 1945 Grand Avenue, Kansas City, Mo. This branch house is in charge of Mort Gaugh.

Carr and Morford Join Herff-Brooks—The Herff-Brooks Corp. has appointed J. G. Carr and Paul Morford district sales managers. Mr. Carr has been with the National Co. and Mr. Morford with the Regal Co.

Willis, Chalmers Assistant—F. B. Willis, has been appointed assistant sales manager of the Chalmers Motor Co., Detroit, Mich. He was eastern district manager of the Lozier Motor Co., also district sales manager for the Chalmers company.

Durning Makes Change—W. J. Durning, formerly connected with the Goodrich Rubber Co., Akron, Ohio, has opened a vulcanizing and tire repair shop, at 138 North Third Street, Louisville, Ky. He contemplates taking the agency for a pleasure car.

Moore Rejoins King—I. B. Moore, late of the Empire Motor Car Co., Indianapolis, Ind., formerly with the King Motor Car Co., Detroit, has rejoined the King Motor Car Co. of Detroit and will occupy the same position with the King Motor Car Co. as he has heretofore, assistant sales manager.

McGiehan in New Orleans—T. H. McGiehan, the late vice-president and general manager of the Motz Tire & Rubber Co., Akron, Ohio, has opened a large retail and wholesale automobile accessory establishment at 1527 Canal Street, New Orleans, La. Mr. McGiehan represents several leading manufacturers in the Southern States.

Houston Makes Change—J. A. Houston, for the past seven years with the

United States Rubber Co., has purchased from George Graham the business of the Broadway Fuel & Oil Co. in Spokane, Wash., dealers in accessories. Before coming to Spokane Mr. Houston was engaged in a similar line in Chicago. U. S., Goodyear and Firestone tires will be carried.

Rosen Heads Wilmington Packard—The Packard Motor Car Co. of Philadelphia, Pa., will open a branch at 222 West Tenth Street, Wilmington, Del. J. H. Rosen of the Philadelphia establishment has been appointed manager of the Wilmington territory. This branch will have under its control the entire State of Delaware, Chester County and part of Delaware County in Pennsylvania, and Salem and Cumberland counties in New Jersey.

Dealer

Louisville Agent to Build—H. D. Bowman, Louisville agent for Chalmers, Pierce-Arrow and Rauch & Lang, will build an addition to his garage at Fourth and Oak Streets.

N. Y. Cadillac to Build—Bids are being received for the construction of a four-story, 60 by 100-ft. garage for the Cadillac Motor Car Co., 1881 Broadway, New York, N. Y. The estimated cost is \$80,000.

Marmon's K. C. Quarters to Add—The floor space of the Kansas City branch of the Nordyke & Marmon Co. will be three times greater, in new quarters now being arranged at 1608-1610 McGee Street. The company has taken a 5-year lease on this new two-story and basement structure.

Jacksonville Overland in New Hands—R. T. Cassell has given up the Overland agency in Jacksonville and it has been turned over to a new firm composed of C. N. Priest and J. F. Claus. The new firm will have its salesroom at the Ford garage, although the new business will be kept entirely distinct from the Ford agency.

Spokane Studebaker Branch Opened—A. H. Brown of Portland, Northwest manager of the Studebaker corporation, has opened up a retail branch for Studebaker cars in Spokane. The Studebaker maintained a branch in Spokane 3 years ago, when it was discontinued and the eastern Washington, Idaho and Montana territory formerly under the Spokane office was transferred to Portland.

Ford Body Co. Makes N. Y. Lease—The Ford Motor Body Co. has leased the store and basement at 10 West 60th Street, New York City.

Republic Tire in Baltimore—The Tire Sales Co., 204 St. Paul Street, Baltimore, has taken the agency for the Republic tires.

New Tire Branch in Dallas—A branch office of the Dallas Double Tread Tire Co. has been opened at 1605 Young Street, Dallas, Tex. A. M. Loomis is in charge.

Detroit Dealer Moves—The McKenney-Devlin Co., Detroit distributor for the King and Haynes, has moved into its new sales and service building at 698-700 Woodward Avenue.

Fuller Battery in New Britain—The Fuller Storage Battery Co., 62 Ann Street, representative of the Willard battery, has established a sub agency in New Britain, Conn.

In New Louisville Garage—The Oak Street Garage is now occupying its new quarters at 309 East Oak Street, Louisville, Ky. It is a one-story brick building of fireproof construction.

New Baltimore Accessory Agent—The Motor Supply Co., Baltimore, Md., a newly formed concern, has opened at Charles Street and Lafayette Avenue, with a complete line of accessories.

Green Bay Garage to Add—The Green Bay Motor Car Co., Green Bay, Wis., is contemplating the erection of a 57 by 65 ft. addition at the rear of the present garage, to give more room for repair shop and storage.

Portland Fisk Builds—W. C. Arthur, Portland (Ore.) contractor, will erect a one-story, 50 by 65 ft. brick building for the Fisk Tire Co., which will be located at the southeast corner of Couch Street and Broadway, Portland.

Opens Manchester Tire Station—J. B. McCrillis & Son have opened a service station and salesrooms at 1137 Elm Street, Manchester, N. H., to handle the Marathon, United States and Congress tires and other accessories.

New Buffalo Salesrooms Opened—The Poppenberg and Mutual Motor Car companies have opened new showrooms at Main, Carlton and Washington Streets, Buffalo, N. Y. The companies handle five makes of cars, King, Saxon, Apperson, Enger and Pullman.

No Longer a Branch—The Oakland is no longer handled in Boston, Mass., as a factory branch. L. B. Sanders, who went there two years ago as manager, has taken the business over as an agency and he will occupy the same quarters on Massachusetts Avenue.

Hartford Buick Makes Change—The Buick representation which has heretofore been vested in the Hartford Buick Co., which was also associated with the

Buick agency in Springfield, Mass., has passed to D. B. Roberts, until recently manager of the Hartford Buick Co.

Louisville Co. Opens Showroom—The Callahan Motors Co., a new concern, which recently acquired the agency for the Chandler Six in Louisville, will open its new show room at 811-813 South Third Street. W. P. Callahan, who formerly resided in Arizona, is head of the concern.

Swinehart Tire in Louisville—The Independent Tire Co., which has secured the agency for the Swinehart tire, has opened a salesroom at 548 South Third Street, Louisville, Ky. N. B. Segal, president of the company, was formerly connected with the United States Tire Co., New York City.

Richards Machine to Increase—The Richards Machine Co., Milwaukee, Wis., manufacturing drill presses and special machinery, has arranged for a large increase in its production, particularly of repair shop equipment for garages, by the purchase of the plant at 3417-3419 Vliet Street, which it has occupied for several years, and adjoining acreage. C. J. Richards is president.

New Company Formed—The Regal Motor Sales Co. is the name of the new corporation formed to succeed the C. R. Robinson Co. for handling the Regal cars in New England with headquarters in Boston, Mass. Joseph Porter, who was one of the factory officials, is at the head of the company succeeding Mr. Robinson, and C. H. Klegge is still with the company as its treasurer.

Connecticut Ford to Remodel—L. H. Elmer of the Elmer Automobile Co., distributor of the Ford in Hartford, Tolland, Windham, Middlesex and Litchfield counties, Connecticut, plans remodeling of the Palace Automobile Station at 348 Trumbull Street, which he recently acquired. The Ford interests will be grouped at the above location immediately alterations are made.

New Baltimore Concerns—After being used as a riding academy for 65 years, a property on Bolton Street, Baltimore, Md., is to be used as an automobile establishment. The property has been purchased by the Howell Motor Truck Co., H. D. Howell, proprietor. It contains about 8,000 feet of space. The Economy Tire Repair Works has been organized and has opened at 16 East Oliver street. W. E. Underwood is proprietor. Accessories also are being dealt in.

Recent N. Y. City Removals—The Hudson Motor Car Co. of New York, Inc., has taken possession of its new salesroom in the Circle Bldg., 1842 Broadway, New York City. The Hartford Suspension Co., Jersey City, has moved into a new salesroom at 1846

Broadway, New York City. The Franklin Automobile Co. of New York, of which G. H. Tisdale is the head, is now occupying its new salesrooms at 1848 Broadway. The Lozier Motor Co. has established New York City headquarters and salesroom at 1850 Broadway.

Goodyear Places New Ohio Agencies—The Goodyear Tire Co. has placed the following tire agencies in Ohio: Mansfield, I. F. Newcomer, Richland Motor Co., H. W. Smith, Mansfield Vulcanizing Works; Plymouth, Plymouth Garage; Shelby, M. D. Doty; Atwater, DeGraff & Biles; Beloit, W. H. Sanders; Berlin Center, L. E. Hawkins; East Rochester, Alfred Malin, F. H. Scattergood; Hanoverton, Conser & Wilson; Homeworth, M. Pilmer; Kensington, Oren Harsh; Marlboro, H. C. Slabaugh & Son; Minerva, Minerva Motor Car Co.; Sebring, Hall Machine Co.; Alliance, Alliance Auto Repair Co., Alliance Motor Car Co. and the Stark Cycle Co.

Hokanson Sells Buick Retail Business—The Hokanson Automobile Co., Buick distributor in Madison, Wis., has disposed of its entire retail business in Madison, Blooming Grove, Burke, Middleton, Verona, the north half of Fitchburg, the south half of Westport and the west half of Sun Prairie to James Doyle, formerly general manager of the Wisconsin Culvert Co. The business will be continued from the Hokanson headquarters on East Doty Street. The Hokanson company recently organized the Wisconsin-Oakland Co., with headquarters in Milwaukee, with Wisconsin, Northern Michigan and a portion of Minnesota as its territory for Oakland cars.

Recent Savidge Appointments—The Savidge Steering Device Co., Indianapolis, has recently appointed the following jobbers and distributors: E. Schoonmaker Co., New York; Klecker Shock Absorber Co., Minneapolis; H. F. Brownell Co., Sioux Falls, S. D.; Roy E. Warner Co., Louisville, Ky.; Herring Motor Car Co., Des Moines; The Fisk Co. of Texas, Dallas; Albany Hardware Co., Albany, N. Y.; Knepper & Knight, Detroit; Erie Rubber Co., Erie, Pa.; U. S. Rubber Co., Rochester, N. Y.; M. E. Remelin, Cincinnati; Fields & Rusness, Fargo, N. D.; City Auto Tire & Rubber Co., Cleveland; Iroquois Rubber Co., Buffalo; G. W. Shroyer Co., Dayton; A. W. Whitaker & Co., Memphis, Tenn.; Cox & Cummins, St. Louis; Burwell Smith Supply Co., Oklahoma City; Adams Alexander Auto Co., Sioux City; Wentworth Brown Co., Amesbury, Mass.; C. V. Reich, Pittsburgh; E. De Tamble, Los Angeles; A. C. Galbraith, Milton, Pa.; O. L. Hutchins, Chanute, Kan.; R. C. Weissmantel, Southampton, L. I.; Shoemaker Bale Co., Little Rock, Ark.; The Motor Shop, Indianapolis; Brant Bros., Indianapolis.

Schramm Building New Garage.—The Schramm Auto Repair Co. is building a new garage at 5610-5612 Easton Avenue, St. Louis, Mo.

Repairs Radiators in Columbus.—The Auto Radiator Repair Co. is the name of a new concern at 153 North Fourth Street, Columbus.

Motz Tire in Toledo.—The H. P. Dodge Engineering Co. has been named Toledo distributor for the Motz Tire & Rubber Co., Akron, Ohio.

New Columbus Garage.—Harry Moore, formerly with the Columbus Buggy Co., will open a garage and repair shop at Broad Street and Wilson Avenue, Columbus.

Rothweiler Heads Seattle Truck.—The Seattle Truck Co. is the latest to enter Seattle, Wash., headed by H. N. Rothweiler, with a service department at Broadway and Denny Way.

Duluth Co. Builds.—The Western Automobile Co., Duluth, Minn., proposes to erect a two-story, 100 by 140-foot, fireproof building for salesrooms and repair department. The estimated cost is \$50,000.

New Cleveland Welding Building.—The Cleveland Welding & Mfg. Co., Cleveland, O., will erect a \$26,000 factory addition to its present buildings on West 117th street. It will be of reinforced concrete.

Cleveland Ball Bearing Adds.—The Cleveland Ball Bearing Co., Cleveland, O., is purchasing considerable new equipment, which, when installed, will give the company's plant three times its present capacity.

McNaull Tire Opens Branch.—The McNaull Auto Tire Co., Toledo, O., has opened a branch in St. Louis, Mo., at 5032 Delmar Boulevard. The office has been organized as the McNaull Tire Co. of St. Louis.

Polson's New Plant.—The Polson Mfg. Co., 27 Chenango street, Buffalo, N. Y., manufacturer of automobile parts, will build a two-story, 85 by 100-ft., reinforced concrete factory at Main street and Lafayette avenue.

To Handle Accessories.—The Pettibone-Peabody Co., department-store operators at Appleton, Wis., proposes opening a department for the handling of automobile accessories and supplies.

Perfection Starter in Hartford.—D. S. Rich at 64 Allyn Street, Hartford, Conn., has taken on the agency for the Perfection motor starter in the State of Connecticut, and the Stone shock absorbers in Hartford County.

To Repair Jitneys.—The Worcester Motor Carriers Corp. has been formed at Worcester, Mass., to make a specialty of keeping in shape all machines that are used in the city for jitney lines. The

company plans to operate a jitney line of its own after looking over the territory.

Garford Service in Frisco.—A. W. McKenzie, district sales manager of the Garford Motor Truck Co., is at present in San Francisco, planning to establish a direct factory branch for the recently reorganized Garford company.

Springer Manager.—The Standard Auto Co. has opened a one-story garage, 60 by 70 ft., at 648-650 West Bridge Street, Grand Rapids, Mich. R. F. Springer is manager. A general repair and supply business will be conducted.

Packard's Chicago Service Station.—The Packard Motor Car Co., 2357 Michigan avenue, Chicago, Ill., has purchased the site at 2340 Indiana avenue, and will build a five-story, reinforced-concrete service station, to cost about \$125,000.

S. K. F. Increases Office Space.—The S. K. F. Ball Bearing Co. has increased its office space in the Hudson Terminal Bldg., New York City. Within the last 4 months it has about doubled its offices, so that now they occupy a full wing on the sixth floor.

New Garage for Pomona.—The new brick garage now in process of construction for the firm of Potter & McCormick on South Thomas street, gives Pomona, Cal., a string of four garages which have sprung up within the past few months ranging from \$3,000 to \$7,000.

Gets Goodyear Truck Tire Agency.—J. E. Power, supervisor of San Francisco, Cal., has secured the agency for the Goodyear truck tire and has opened a service department on Van Ness avenue in that city. The name of the new concern is the Motor Truck Tire Service Co.

Toledo Garage to Move.—The United Garage Co., Toledo, Ohio, has arranged to move from its present location to larger quarters at Ontario and Jefferson Streets, about September 1. The company has taken a 20-year lease on the premises. M. R. Himes is general manager.

New Vancouver Garage.—W. F. Silver has opened a garage at Central Park, corner of Kingsley and Silver Avenue, Vancouver, British Columbia. In connection with the garage he will maintain an up-to-date service station, stocking Pennsylvania Vacuum Cup and Congress tires as well as accessories.

Hupmobile Opens Newark Salesroom.—A new salesroom for the sale of Hupmobiles was recently opened at 200 Halsey Street, corner of Branford Place, Newark, N. J., by the newly-formed firm of De Cozen & Riess. The firm consists of Alfred De Cozen and George L. Riess, vice-president of Chas. E. Riess & Co., Inc., Metropolitan distributor of the Hupmobile.

Milwaukee Co. Dissolved.—The Graper & Paulus Welding Co., 254 Fifth street,

Milwaukee, Wis., has retired from business and the partnership between F. E. Graper and Wenzel Paulus has been dissolved. The concern was a pioneer in Milwaukee in the welding, cutting, lamp and radiator and fender repair business. Practically all of its trade was in the motor car business.

To Make Motor Brushes.—R. H. Seabury, a chemical engineer of Wellesville, N. Y., has located in Toledo, O., to manufacture motor brushes, used on electric motors. Mr. Seabury is the owner of the patents. Large orders for the brushes have been placed by the Electric Auto-Lite Co. Seabury has received his machinery and the factory will be in operation in the near future.

Cartercar Service Station Opened.—A new Cartercar service garage is now in operation at 1822 Hendrie, near Woodward Avenue, Detroit, Mich. It is managed by W. D. Block, who was comptroller of the Cartercar Co., Pontiac, Mich. This service station has been established because the Cartercar Co. discontinued its local branch and service department some time ago.

Leavitt Co. Agency in Fresno.—J. W. Leavitt & Co., Pacific Coast distributor of the Willys-Overland Co., has established a branch in Fresno. Calvin C. Eib, executive supervisor of the company, is at present in charge of the new branch and is installing a service system and perfecting the general workings. The company will occupy a space 50 by 150 feet in the main section of the town.

Hegeman Heads Milwaukee Firestone.—The Firestone Tire & Rubber Co., Akron, Ohio, has permanently established a Milwaukee factory branch in the new Oxford building at 481-483 Jefferson street, which provides nearly 12,000 square feet of floor space and stockroom for 7,500 casings. J. L. Hegeman is in charge as local manager. Practically every important tire manufacturer now has a direct factory branch in Milwaukee, and nearly all are located on Milwaukee, Oneida and Jefferson streets, built up during the last three years as Milwaukee's tire row.

Hartford Oakland Makes Alterations.—The A. C. Hine Co., Hartford, Conn., is making alterations in the store at 314 Pearl Street which, when completed, will be used as a salesroom for Oakland cars for which the concern recently signed up for the State of Connecticut. The basement will be used as a service station. A. C. Hine, formerly general manager of the Overland-Connecticut company, is the prime mover in the project and with him are associated his father, D. H. Hine, and E. N. Humphrey of the Traut & Hine Co. of New Britain. R. J. Flynn, formerly with the Auto Tire Co. as an Oakland salesman, has joined the Hine forces.